Vol. III. No. 6. PRICE TEN CENTS.

THE LIBRARY OF CONGRESS.
TWO COPY RECEIVED
JUN. 12 1901
COPYRIGHT ENTRY
CLASS XXc. No.
COPY B.

The Automobile

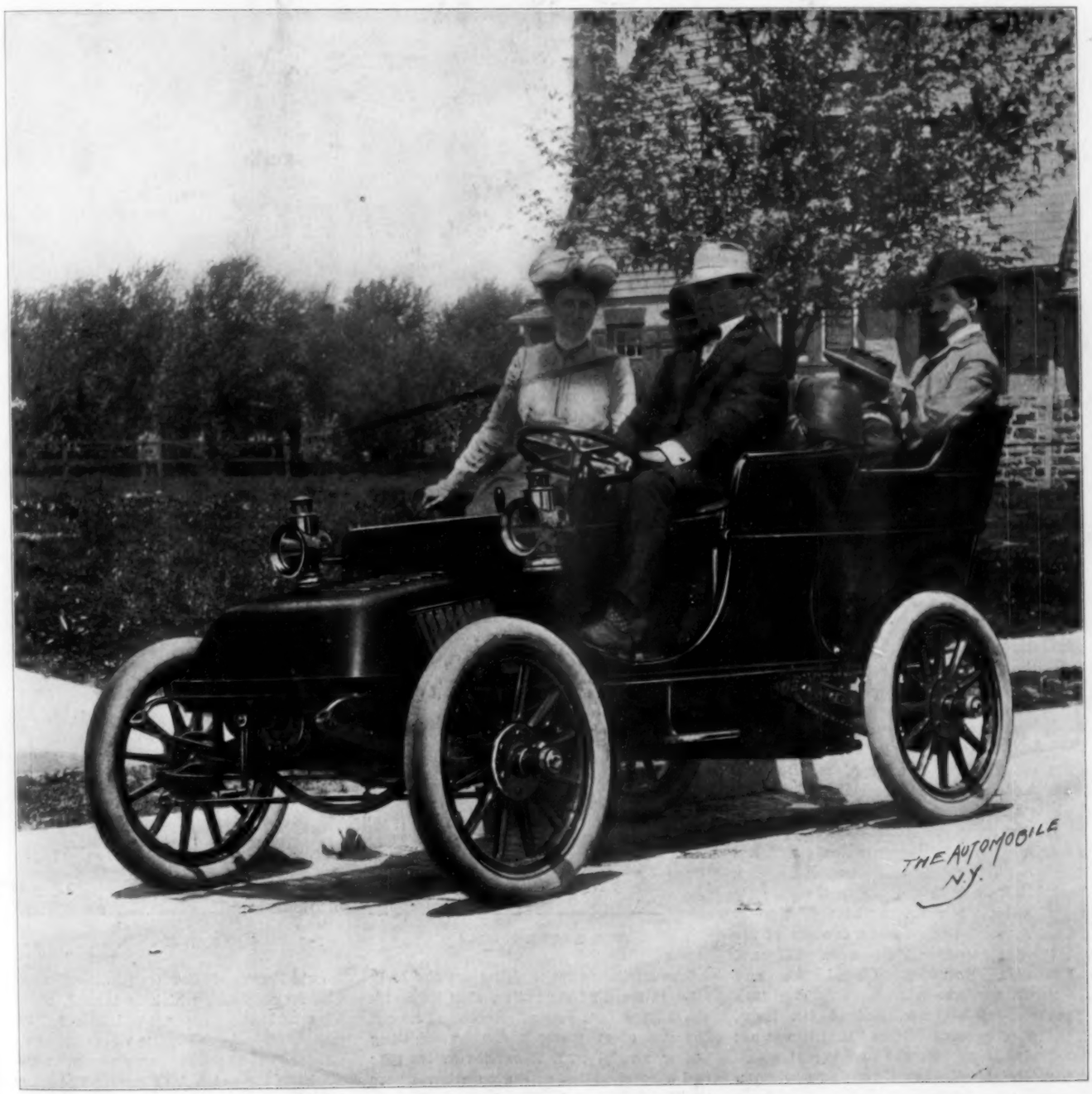
AN ILLUSTRATED MONTHLY JOURNAL.

Published at 150 Nassau Street.

NEW YORK, JUNE, 1901.

Copyright, 1901, by The E. L. Powers Co.

Entered at New York Post Office as second-class matter.



A NEW TOURING "AUTOCAR,"
WITH TONNEAU BODY.

A New Touring "Autocar."

The front cover illustration shows a touring car recently completed by the Autocar Co., Ardmore, Pa., for fast road work. It is propelled by two of the company's regular 6-HP. motors, with opposed cylinders, 4 by 4 inches, working on one shaft. European practice is followed in the general arrangement, the motors being under a hood in front, and a transmission on Panhard lines, but with the clutch operated by a lever instead of a pedal. A throttle combined with variable ignition lead gives intermediate regulation, and speeds from two to thirty-one miles are obtainable. The car will seat seven people, and weighs 1,745 pounds loaded for a run of 200 miles. Thirty-two-inch wheels with 3½-inch Dunlop tires are used, and the steering gear was supplied by the Winton Motor Carriage Co., being their standard worm gear with hand wheel. Mr. William Morgan, of the company, expects to drive this car in the A. C. A. endurance test in September.

For an Annual Road Race.

The Automobile Club of America has decided to organize a road race, called the Automobile Club of America Sweepstakes, to be contested annually over a course selected with the approval of the local authorities and between 50 and 100 miles in length. The course will be properly policed, and the entry fee will be $100, with $50 additional for starters. The club will raise $1,000 or more for the event, and it is hoped to make the sweepstakes amount to $5,000. The winner will receive 80 per cent. of the stakes, and the second and third respectively 15 and 5 per cent. Entries will be open to all the world. It is probable that the proposed Erie to Buffalo contest in September will be the first of these races.

In addition, the club will organize an annual contest for the mile record, over a course selected with the consent of the local authorities and properly policed. Entries will be classed according to motive power, and a cup will be awarded the winner in each class. The entry fee will be $10.

Automobiles in Central Park.

Following the signing of the Doughty automobile bill, the Park Commissioners of New York City issued an order restricting the speed of all motor vehicles in Central Park to seven miles per hour, and requiring that those not carrying a permit should slow down to three and a half miles when passing horses. The A. C. A., regarding this as an evasion of the law, endeavored, in the persons of Messrs. Shattuck, Bostwick, Chamberlin and Church, to force a test case. The park authorities, however, dodged the issue, and when pressed declared that it was not intended to enforce the rule except where a motorist failed to slow down when a horse was frightened.

The Century Steam Carriage.

By Herbert L. Towle.

The use of bevel gear or chainless transmission for light vehicles has already made considerable headway among French voiturette builders, and it is eminently fitting that its advantages should find recognition on this side of the water among builders of steam carriages. It is by the employment of this system of transmission that the Century vehicles are especially distinguished.

FIG. 1. THE CENTURY STEAM CARRIAGE.

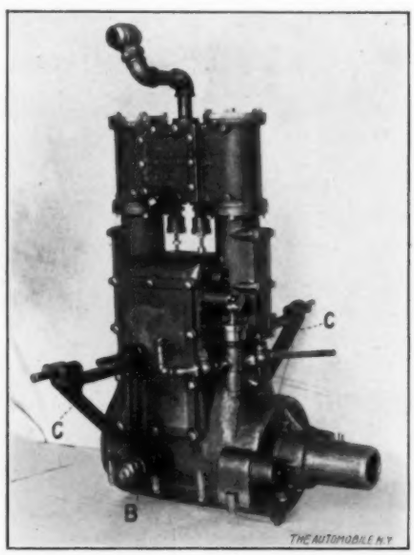


FIG. 2. THE ENGINE.

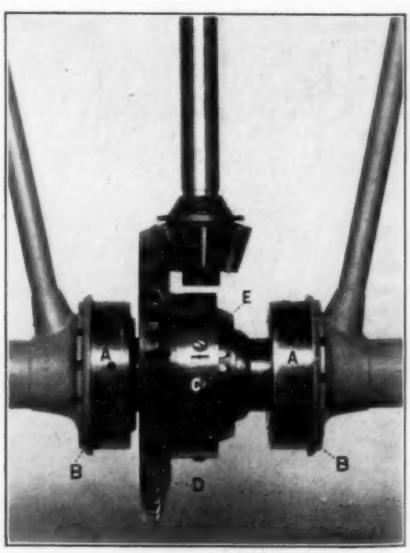


FIG. 3. THE BEVEL GEAR TRANSMISSION.

The engine is suspended from the body sills, in front of the boiler, with its crank shaft lying fore and aft instead of across the line of progress; and a transmitting shaft co-axial with it carries at its rear end a bevel pinion acting on a bevel gear on the differential. Fig. 2 shows the engine complete. It has cylinders 2½ by 3¾ inches, double-acting, and with Stephenson link motion. It is completely encased, giving a very rigid frame, and the cranks run in oil. A crosshead connection works the feed pump outside, and on the front side of the case a similar arrangement connects the slotted links of the valve gear with a heel pedal, pressure on which reverses the engine. The rear end of the crank case contains a brake wheel (Fig. 4), which is keyed on the forward end of the transmitting shaft. The crank shaft, which is turned, eccentrics and all, from a solid forging, imparts motion to the brake wheel by an extension of the rear crank pin, which works in the notch A (Fig. 4). The transmitting shaft is inclosed throughout, and

both ends run in ball bearings. The bevel gears and differential are likewise inclosed in a split case which fits over the two spanner rings A A (Fig. 3), and fills the space between the shoulders B B. An oil cap provides for lubrication, and the rear half of the case may be removed for inspection by undoing six screws. See also Fig. 6. The construction of the rear axle is as follows: A solid round bar extends clear through from wheel to wheel, and on it is shrunk the hub of the bronze differential ring C (Fig. 3). This ring is recessed to carry the three differential pinions, one of which is seen in the cut, and the bevel gear D is cast in one piece with the ring, the teeth being planed in a special machine. The two larger gears of the differential, one of which, E, is seen, are keyed and brazed on the inner ends of two steel tubes, to the outer ends of which the rear wheels are keyed. These tubes have bearings on the inner solid rod at both ends, and are carried in ball bearings in the inclosing tubular members of the frame. The inside solid rod,

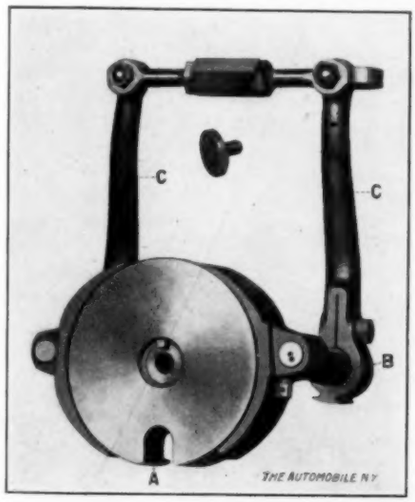


FIG. 4. THE BRAKE.

which is about 1⅛ inches in diameter, helps to tie the whole arrangement together by washers and nuts on its outer ends, and in addition is depended on for the necessary stiffness, since the gear case is not secured to the frame otherwise than by its fit between the two shoulders mentioned. As this bar turns with the differential ring there will evidently be relative motion between it and the wheels only when turning corners.

The brake, referred to above, is shown in detail in Fig. 4. It has two metal shoes, carried on pins slightly eccentric to the short rock shafts B B. These rock shafts are worked simultaneously by the arms C C, which are connected with a pedal under the driver's foot. This brake is equally effective in either direction.

In Fig. 5 is seen the bottom of the boiler and burner, with the burner shield removed. A straight vaporizing tube crosses the centre of the fire space, coming out at A. Here the vapor has two paths—one through the automatic diaphragm regulator B to the mixing nozzle and the other to the pilot light controlled by the valve D. The pilot light has a blue flame several inches long, and plays under the near half of the vaporizing tube, under which there are no burner holes. To start the fire, the valve E is opened and a little liquid gasoline allowed to run

FIG. 5. BOTTOM OF BOILER AND BURNER.

into the pan F. Burning this gives heat enough to start the pilot light, after which the main burner can quickly be started.

Aside from the fuel regulator there are no automatics in this carriage. The usual hand pump for water is supplied, and the

FIG. 6. REAR VIEW.

exhaust passes directly from the engine to the muffler and thence to the downward flow through the water tank at the rear. A sheet-iron shield under the burner, pierced with small holes, protects it from the wind.

Except for the pedal reverse, the entire control of the engine is in the steering handle. The steering lever contains a flexible shaft, and a twist of the handle from horizontal to vertical opens the throttle wide. There is a good deal of motion between the throttle and the handle, owing to the flexibility of the shaft and the numerous joints, but this is taken up by the steam pressure on the throttle valve, and the writer is assured that it causes no inconvenience in driving. Owing to the pressure on the throttle valve, the latter will close itself when the handle is released.

The two reaches of the underframe are swiveled in longitudinal sockets in the front axle, and owing to the two halves of the rear frame being separate, there is no wrenching strain between them when one of the front wheels lifts from the ground. The engine itself is swung from the trunnions B (Fig. 2), the two triangular links C C being themselves swung from the framework of the body. The steam and exhaust connections are likewise flexible, and there is a sleeve joint between the sleeve of the transmission shaft and the after bearing of the crank case. The whole arrangement appears to constitute an efficient substitute for the more usual universal joints in the transmitting shaft.

The wheels are 28 inches, with 40 spokes, and wood rims with single-tube tires or steel rims with Dunlop tires are furnished, as desired. The wheel base is 5 feet, and the gauge is standard, 4 feet 8 inches. Ten gallons are carried in the 14-gallon tank, with air space above the gasoline; and the water tank holds 34 gallons. With tanks filled the total weight is about 1,000 pounds. The whole carriage runs very smoothly and quietly, and bears evidence of careful design and thorough workmanship.

The Variable Cut-Off; How Far is it Practicable?

As the subject of a variable cut-off is one of considerable interest to steam vehicle users, on account of the gain in steam economy possible where it can be used, THE AUTOMOBILE has made inquiries among a number of experienced operators, with a view to learning just what is possible in that direction with the machines at present most used. Below are given the replies received:

Mr. J. A. Kingman, of the Locomobile Co., of America: "To some extent the feasibility of varying the cut-off depends on the ability of the engine to overcome the high compression thereby caused. In effect, shortening the cut-off is accomplished by shortening the travel of the valve, and this not only causes the steam to be cut off earlier, but results in closing the escape of the exhaust earlier as well. With a fairly taut chain this makes no trouble, but a loose chain may whip and jerk under the reversing strains.

"Beyond this, we frequently find that at high speeds shortening the cut-off usually causes a pounding in the valve chest. It is not easy to trace the reason for this, and some of our engines operate very perfectly on all degrees of cut-off. I am inclined to attribute it, however, to a fluttering of the valve on its seat, due to the rapid motion of the former and to the wire-drawing of the steam in rushing through the very narrow port openings. Where all parts are small, it is practically impossible to get two engines that will behave just alike when put together. It should be remembered that the Locomobile cuts off at half stroke with the links in the full forward motion, whereas a locomotive under the same conditions cuts off at nearly full stroke. Personally, I think that one can economize fuel much more by keeping the bearings in the engine, chain, and wheels well lubricated and adjusted, and the boiler clean, than by nice manipulation of his reverse lever."

Chas. R. Otis, Yonkers, N. Y.: "I own and have run for a year past a "Mobile" carriage, made at Tarrytown, N. Y. The valves are worked by the usual link motion, and soon after receiving my carriage I arranged the reversing lever so that it can be set back and use the steam expansively so far as that can be accomplished in connection with this style of engine and valve motion.

"I think, after use, under both full and partial throw of the valves, there is a slight saving in water and fuel by its use. I do not, however, believe this form of cut-off to be a perfect one, nor by any means as effective as a scientifically constructed fixed cut-off, or, more properly speaking, a separate independent cut-off, made variable to suit the requirements by special means.

"The cutting off by means of a link motion I find causes a slight knock in the engine, which I attribute to imperfect exhaust clearance, due to the premature closing of the exhaust ports when the throw of the valve is shortened.

"For this reason, I regard that form of cut-off as imperfect. Nevertheless, this is probably the simplest and best form of cut-off for very small engines, such as are used on motor wagons."

Dr. Paul Norwood, Ansonia, Conn.: "I have made no comparative experiments with a view to calculating exact difference in fuel and steam consumption, but with my engine, an old-style Mason, there is certainly an economy in using the short cut-off. This has been many times proven to my satisfaction, and with particular force when, from soot, etc., my boiler was not steaming fast enough. The short cut-off then conserved to a very noticeable degree the steam pressure. I have noticed also that sometimes, when running with lever full forward, a reduction of eccentric stroke very materially increased the speed without any change in throttle. There have been times when the short cut-off, if too short, produced the knock in the engine and a jerking on chain. I reasoned that this must be due to faulty setting of valves or piston heads and I found that a finer adjustment of the valves did away with the knock. This fine adjustment of valves I find an extremely delicate piece of work. I habitually use short cut-off."

A MOTORETTE IN CALIFORNIA.

Henry Howard, Boston, Mass.: "In answer to your inquiry of May 9 will say that I have given the question of the variable cut-off on steam carriages considerable attention. My opinion, based on my own experience, is that a very considerable saving is made if the cut-off is handled judiciously. I proved to my own satisfaction last summer that shortening the cut-off under proper conditions reduced the consumption of water. The carriage that I was using was one of the original Locomobiles, and had one of the small pumps with a plunger ½ inch in diameter. On a trip through the western part of this State I found this pump to be of insufficient capacity on the rough country roads to supply water to the boiler as fast as I was using it when I was running with the links thrown away forward. On the other hand, the same pump would supply more water than I required, if I kept the valve linked up as much as possible without causing a knocking in the engine. The valve motion should, of course, never be linked up to such a point that knocking is produced in the engine, as this means that a vacuum is produced in the cylinders on the latter part of each stroke, caused by insufficient steam being admitted to fill the cylinder at atmospheric pressure. Following this reasoning out, it means that there is no economy in shortening the cut-off under conditions when the running would require very little steam; that is, running slowly on a smooth, level road, or running on a down grade. On the other hand, the greatest gain is made when running at very high rates of speed on a level road, or up hill. Under these conditions the throttle valve may be thrown wide open and the speed regulated by varying the cut-off."

S. Rushmore, Jersey City: "From my experience with a steam carriage there can be no doubt as to the economy of operating with the shortest possible cut-off.

"My machine was originally a Mobile, but I have so completely rebuilt it that it is now quite another machine. When new the machine weighed 650 pounds with tank filled and would average 10 miles per gallon of fuel and 18 miles on water supply. The ball bearings were a failure and I fitted the engine with solid bronze bearings and shrunk hardened steel collars on crank shaft and pins; also fitted sight-feed oil cups with copper tubes leading to slides, crankpins and main bearings. I reinforced the frame with about 40 pounds solid steel, inclosed all parts in sheet-iron guards, increased tanks and altogether raised the weight of machine to 1,000 pounds without passengers.

"I added a feed coil to the muffler, consisting of 25 feet ⅜-inch copper tube, and from this the feed passes through 20 feet of the same size pipe wound into a spiral over the top of the boiler and enters the boiler at fully 212°.

"Originally the reverse lever had but a single notch, at which the engine cut-off at seven-eighths stroke, and the exhaust was as lusty as one could desire, especially on a slight grade, and on a hill it would rival a pack of firecrackers. I drilled a number of other notches and found that the engine would run smoothly cutting off at one-half stroke. When hooked up earlier than this the compression causes snapping of the chain, and at three-eighths cut-off this becomes severe.

"I carry 170 pounds steam and 50 pounds air, maintained by power pump, and can maintain a speed of 30 miles per hour on level macadam cutting off at half stroke and with a fuel consumption averaging one gallon for 13 miles. Using full boiler pressure the half cut-off will carry the machine with two passengers up a 10 per cent. grade at eight miles per hour, and on steeper grades I usually let the links out to three-quarters, while for starting on a bad hill open almost full stroke.

"Sometimes, after starting in full gear, I will forget to hook up the gear and my attention is quickly called to the fact by the falling steam pressure. Conditions being the same, I have found that I can run 25 per cent. faster on half cut-off than with seven-eighths, as employed by most makers.

"I have increased the weight of the machine 350 pounds and can now run three miles further per gallon of fuel, and I attribute about half of this to the cut-off and the rest to the feed heater and economizer.

"It would seem to me well worth while to fit the engines with flywheels, so that the speed could be regulated entirely with the cut-off, although it is possible that the superheating action of the throttle at half cut-off is worth as much as any gain from greater expansion.

"One cause for the snapping of the chain with nearly every cut-off is that in most steam carriages the valves are not accurately set and do not distribute the steam evenly. I have reset the valves on a number of carriages and always found them far out of place, sometimes causing nearly all the work to be done in one end of the cylinders, even in full gear.

"I made no tests of water consumption with the old machine and late cut-off, but I now average 30 miles at 15 miles per hour, up hill and down, on one tankful of 22 gallons."

Two users of Locomobiles report no experience, and no replies were received from several others. As our request was to report experience, if any, it seems proper to infer that these latter had made no experiments with the cut-off.

W. K. Vanderbilt, Jr., has been elected a life member of the Automobile Club of France.

The Steam Carriage as a Physician's Trap.

By Frederic E. Sondern, M. D.

Approximately one year ago, after five years' experience with one and two horses and the necessary carriages, kept for the sole purpose of rapid transportation in New York City, as demanded by a physician's work, I concluded that I had suffered sufficiently at the hands of the proverbial horse dealer, the carriage maker with a different price for each purchaser, unreliable coachmen, indifferent livery stable service and improper care of property intrusted to them, to say nothing of the dozen and one little statements at the end of the month and tips for hostlers, washers and what not.

As the result of this conclusion, I sent my entire outfit to the auction mart and resolved in future to ride in other people's—liverymen's—carriages or trust to the public carrier system. There was however, one alternative, the automobile, which I decided to try, and to-day, after the lapse of more than one year, I am heartily glad I did, for I have thus found what is sure to be the physician's trap par excellence on account of its many virtues and few faults.

"The next question was the selection of one. The electric vehicles I found very expensive, not only in original cost, but in repairs and storage as well, very slow even for New York streets, and of course useless for touring. The gasoline carriage seemed extremely complicated in mechanism, rather unwieldy in size, noisy not only when running, but also when standing still, odorous, and also expensive.

The steam carriage, on the other hand, was neat and trim in appearance, its power one with which most everybody is familiar, its response quick and thus the control perfect, and its cost much less than either of the other two classes; of course, the escaping steam was disagreeable—to the other fellow. I decided on the last named.

In this necessarily brief description of my experience I shall attempt not to be partial, either to the good side only of a steam carriage or to the particular make I employed—the Locomobile.

The time necessary to get the carriage ready for use, that is, firing, oiling and supplying air pressure, depends of course upon the service in the particular automobile storage stable; my experience with most of them is that 20 minutes can be counted on before you can get in and ride off, which is from 10 to 15 minutes less than it takes to get a horse or team ready in a livery stable.

The quick response of the steam carriage, as compared to a horse and carriage, in steering, speed in one or other direction, and the ability to stop quickly, are the virtues by which more rapid transportation is possible, especially where traffic is heavy, and this without exceeding the legal speed limit. This feature is one that appeals particularly to a physician, for an hour or more a day is a great saving of time.

It is well to have some one in the carriage to look after it and prevent its being tampered with during stops; also to light the fire in case it blows out or is put out when stopping, and in order to avoid soiling the fingers and clothes also on muddy days.

The automatic device can easily be arranged in such a way that stops of 20 minutes or more can be made without the safety valve blowing if the fire is not put out.

I have found the carriage useful in all kinds of weather as far as the past winter presented it; of course we had no heavy snow storms, but what we had offered no bar to its usefulness, and in fact I frequently passed my fellow physicians whose horses were struggling on the snow-covered slippery asphalt pavement. The item of the automobile slipping on wet asphalt worried me quite a little at first, but one becomes experienced very quickly, and with care on corners, cross-car tracks at a good angle, and leaving the brake alone as much as possible, this annoyance is guarded against.

In the matter of expense, without going into details, I can say that the original outlay, as well as keeping, repairs, etc., compare very favorably with one horse and buggy and are certainly less than those connected with a team of horses.

Aside from city use, where the advantages over horseflesh are undoubted, to say nothing of the peace of mind in the knowledge that the carriage will go only where and when you wish it, the automobile offers much pleasure and recreation on summer days when the heat is such that to use horses would be torture. In such weather last summer I traveled 925 miles in 18 days, thus making a most delightful trip, impossible by any other means of transportation.

All users of the steam carriage are by no means blind to the fact that the manufacturers must supply us with a heavier engine, consisting of a smaller number of parts less liable to become out of adjustment, with the necessary guards to prevent loss of screws and bolts by jar, and particularly with automatic oiling devices, such as are found on every scientifically constructed machine to prevent undue friction and consequent wear. The body, and particularly the running gear, must be heavier and better suited to withstand hard usage. There should be a larger capacity for fuel and some arrangement for the automatic maintenance of the necessary air pressure. Time, experience and competition can surely be counted on to bring about these improvements.

From New York to Washington by Steam Carriage.

By Mrs. F. P. Avery.

Having spent a most delightful summer touring through New England and the beautiful country around New York City, my husband and I thought it would be great fun to travel home in our own horseless carriage. Shipping all baggage, we started on our journey from New York to Washington, early in September.

Through some misunderstanding we expected to cross on the ferry to Jersey City without drawing off the naphtha, so the tank had been well filled. Although my husband tried at the different piers, the carriage would not be allowed on any ferry until the naphtha had been carefully emptied into the river. When we reached the Jersey side a steam carriage, with two men in it, was being hauled on to the ferry we had just left, and we wished so much they could have had our wasted naphtha. Not until 3 o'clock in the afternoon were we ready to leave Jersey City. The roads were poor to Newark, but once out of Newark they were good all the way to New Brunswick, where we remained for the night. Leaving New Brunswick about 8 o'clock the next morning, we expected to reach Philadelphia by noon, but the wheels of our carriage had been greatly strained by the sandy roads of Connecticut and we were now suffering the consequence; spokes fell out of each wheel, and in one wheel four spokes were loose.

When we reached Philadelphia, late in the afternoon, the carriage was left at the shop to have the wheels fixed, and we went to the hotel.

The following afternoon the carriage was brought around all ready for us to continue our journey. We had scarcely traveled a mile when it was discovered something was wrong with the engine. Upon examination my husband found the feed pipe closed and the pump lever was broken. Back to the shop we returned, and with many apologies the repairs were quickly made.

Steaming out of Philadelphia as fast as the law would allow, we were soon on the Lancaster Pike, a fine road through the suburbs.

We took tea at the Green Tree Inn, at West Chester. The inn was built in 1789.

Our next accident was to have the fastenings of the naphtha tank break off on one end. A wide ribbon stock which I wore was used to fasten up the tank until something better could be had. It was very late—about 10 o'clock—when we arrived at the hotel at Wilmington.

Making an early start from Wilmington, we had a long, hard and most uninteresting ride. While the roads were good country roads, they led through the unpicturesque new South. The horseless carriage was new to the small niggers of Delaware and Maryland, and they greeted it with shouts of delight. As the carriage passed by the cabins, the windows and doorways would be filled with black faces. We had much difficulty in getting water, as the impression seemed to prevail that the engine must drink up the water as a horse would. We were always told in our quest for water: "There is a river or there is a spring about a mile back." We traveled three miles out of our way one time to find the spring water dipped up with a tin cup.

The road map we followed said to take the boat at Tolchester for Baltimore. So to Tolchester we went, reaching there about 7 o'clock. As we had been unable to get luncheon along the road, we were starved for something to eat. The fine hotels we had heard so much of were closed for the season, and there was no place for us to spend the night or get supper. Most fortunately for us, the steamer made an extra trip that night, and we were taken aboard at 8:30. With joy we exchanged a dollar bill for two hard ham sandwiches. We learned too late that the afternoon boat could have been taken at Fredericktown, and as it was the steamer went to Fredericktown before crossing to Baltimore. We were so tired when we reached Baltimore that we did not try to get up steam, but left the carriage at the wharf and took a hack to the hotel.

The next morning my husband went down for the carriage and hired a boy to guide him through those narrow cobbletone streets back to the hotel. We were directed to the best street leaving the city and were not long in reaching Frederick Pike, the worst toll road we ever traveled.

We seemed destined to have an accident each day. The carriage was traveling rapidly over quite a good road, when the chain jumped the sprocket and nearly wrecked the machine; luckily for us there were some men near by fixing telegraph wire, and with their assistance the chain was put in place and the guard straightened out. We were again on our way, I cannot say rejoicing, as we assured each other every mile or so that never again would we travel through that uninteresting country.

Nearing Washington, we met a man on the road who gratuitously informed us that "he would be d——d glad when those things [horseless carriages] were ordered off the road." We did not wait to tell him they had come to stay. At last we were near enough to Washington to enjoy the benefit of the good roads that reach out from that beautiful city; although the sun had gone down and the lamps were lighted, the throttle was opened and we traveled with a speed we had not known for two days.

In looking back over the trip, Lancaster Pike was by far the most enjoyable part of our tour. While we were often obliged to travel out of our way for water, we had no trouble in getting naphtha; all the small stores had it on hand at very reasonable prices.

The Edison Storage Battery.

The new storage battery invented by Thomas A. Edison was the subject of a paper read by Arthur E. Kennelly at the annual meeting of the American Institute of Electrical Engineers, New York, May 21. As this was the first public announcement regarding the battery, an abstract of it will be of great interest.

The especial advantages claimed for this cell are: Long life; large storage capacity per pound; durability under careless usage and under heavy charging and discharging, and cheapness.

An entire departure from the lead cell is made in elements and electrolyte. The positive element, corresponding to the zinc of a primary cell, is iron, while the negative element is a superoxide of nickel, believed to have the formula NiO_2. The electrolyte is a 20 per cent. solution of caustic potash.

The initial voltage of the cell after recent charge is 1.5 volts, which drops rapidly on discharge to about 1.35 volts (on open circuit), and thence gradually fails to about 1.1 volts on full discharge. At its normal discharge rate the storage capacity of the cell is 14 watt-hours per pound, corresponding to 53.3 lbs. per horse-power hour, as against 100 lbs. or more for the ordinary lead cell. Normal discharge occupies 3½ hours, but the cell may be discharged in 1 hour, without damage and with a loss of only one-seventh in electrical efficiency.

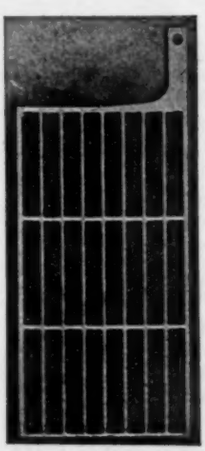


Fig. 1. Nickel-plated steel grid for either positive or negative plate.

Fig. 2. Assembled and completed single plate containing 24 briquettes of active material.

Positive and negative plates are alike, and differ only in the chemical composition of the active materials—iron and superoxide of nickel. Each grid consists of a sheet of steel, 0.024 (nearly 1-40) inch thick, out of which rectangular holes are stamped, so that the grid resembles a window-frame (see Fig. 1). Each aperture is filled with a shallow box containing the active material, and this box, which is a little thicker than the grid, is perforated on both sides to admit the electrolyte. The boxes are stamped from sheet steel, 0.003 inch thick and nickel plated, and each box contains a closely fitting cake

or briquette of active material. The boxes, closed by perforated lids of the same material as themselves, are fitted into the apertures of the grid, and the assembled plate is then put in a hydraulic press and subjected to a total pressure of about 100 tons. This pressure not only tightly closes the boxes but also forces their metal sides over the adjacent edges of the grid, thus changing the whole into a rigid plate. Thus finished, the boxes are 1-10 of an inch thick.

Fig. 3 shows one of the boxes, with briquette and lid, ready for insertion in the grid, and Fig. 2 shows the assembled plate.

The positive briquettes are made by mixing a finely divided oxide of iron, obtained by a special chemical process, with a nearly equal volume of thin flakes of graphite. The latter does not enter into any of the chemical actions, but merely assists the conductivity of the briquettes. The mixture is then pressed into briquettes in a steel mould, under a pressure of two tons per square inch. In size the briquettes are nearly 3 ins. by ½ in. The negative briquettes are made similarly, with the substitution of a finely divided compound of nickel for the iron compound of the positive briquettes.

A suitable number of positive and negative plates are assembled together, being separated by thin sheets of perforated hard rubber, and are placed in a battery jar of sheet steel, which is not attacked by the potash electrolyte.

On discharge, the current passes through the solution from the iron to the nickel, and vice versa in charging. The effect of charging is to break up the iron oxide, reducing it to spongy metallic iron and carrying the oxygen backward against the current to the nickel, which is thereby changed to a higher oxide. In this condition the iron is ready on the first opportunity to take back the oxygen, and if removed from the cell it will rapidly oxidize in the air, liberating heat in the process. In the solution, however, it remains inactive till the external circuit is closed, when the oxygen passes back to the iron and the energy which in the air would be liberated in the form of heat appears as electrical energy.

The potash electrolyte acts simply as a carrier, and remains chemically unchanged. In this respect the Edison cell differs radically from the lead cell, in which the sulphuric acid is partially reduced to water on every discharge, to be reconverted into acid on charging. On this account the quantity of electrolyte carried can be reduced to a minimum far below that possible with the lead cell.

The briquettes of active material slightly expand on receiving oxygen, and slightly contract on delivering it, and this change of bulk is taken care of by the elasticity of the thin steel containing-boxes, so that the electrical contact is always secure. No active material has been found to be ejected through the perforations in the boxes, even under deliberate overcharging and discharging. Such gas as is produced appears only on the external surface of the boxes. So far as observed, the cell may be discharged to the zero point without injury, and the plates may be removed from the cell and dried in the air without loss, other than that the positive (iron) plate loses its charge by oxidation and requires to be recharged.

Mr. Edison has had a battery of this description in an electric runabout for several months past, and has subjected it to

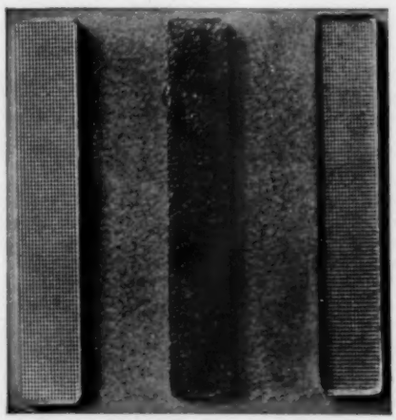


FIG. 3. STEEL BOX, LID AND BRIQUETTE OF ACTIVE MATERIAL.

the severest tests. He declares that there is no hill in the vicinity of Orange, N. J., where his home is, which the machine will not climb.

A company known as the Edison Storage Battery Co., has been organized, and the new battery will soon, it is announced, be manufactured for the market on a large scale.

A Road House for New Yorkers.

It is announced that John Jacob Astor is shortly to erect a road house on a splendid scale for automobilists and coaching parties, at the intersection of Pelham road and the Williamsbridge road.

A Motor Stage Line on Long Island.

The Long Island Traction Co. has acquired franchises to operate motor stages and express wagons through all the incorporated towns of Nassau County, L. I., and also through the southern part of that county, connecting the villages with Mineola, the county seat. Contracts have been made with the Jas. H. Lancaster Co., 95 Liberty St., New York, for the delivery of three stages and one express wagon by the middle of July, and much larger orders are expected to follow. The stages will seat twenty passengers and are equipped with four-cylinder motors of 16 h. p. under the driver's seat. Transmission is by chain, and a compressed air device is used to start the motor.

A Historic Lawsuit Up Again.

The now historic lawsuit of Mason et al. vs. West, arising out of a laundry wagon runaway caused by the latter's steam carriage, is again to the fore. It will be remembered that the Municipal Court of Rochester, where the accident occurred, awarded the plaintiffs damages and costs, and that Judge Sutherland, of the County Court, reversed this decision, declaring that no negligence was shown and that automobiles were entitled to equal rights with horses on the road. The Fourth Appellate Division of the State Supreme Court has now reaffirmed the first decision on the ground that the motor vehicle was unduly noisy. In the meantime, Mr. West has died, and a State law has been enacted to regulate automobiles, but nevertheless the precedent is considered too dangerous to be let stand, and the A. C. A. has resolved to take up the case in behalf of the wife and children of the defendant. It has been appealed to the Court of Appeals.

To Establish Many Supply Stations.

A project is on foot, backed by the Columbia Lubricants Co., 22 Burling Slip, New York, for the establishment of a large number of automobile supply and repair stations on the chief touring routes in the east. In brief, it is proposed to select the best equipped bicycle or repair men in the several towns, and so complete their equipment as to have three classes of stations, as follows: No. 1 stations, having facilities for charging electric vehicles and making ordinary repairs not requiring factory attention; No. 2 stations, same as above but without electric charging facilities; No. 3 stations, supplies and trifing repairs. All classes of stations will carry standard stove gasoline and high-grade lubricating oils. The No. 1 stations will be located every 20 miles, with the No. 2 stations midway between them and No. 3 stations at the intermediate five-mile intervals.

A tour book will be published giving lists of these stations, and also the hotel accommodations and prices in the principal towns, with road maps, distances, and extracts from local and state laws governing automobiles in the different localities. It is proposed to form "chains" of these stations along the routes from New York to Philadelphia, New York to Boston via Hartford and Springfield and also via Newport and Providence, and from New York to Albany and to Buffalo if possible. The organizers hope to issue the first edition of their handbook of tours in July, and will follow it with others as often as needed to keep the information up to date.

The Daimler Mfg. Co., Steinway, Long Island City, is at work on the drawings of a 16 HP. passenger car of the "Mercedes" type.

Something About Tires.

At the meeting of the A. C. A., April 23, a paper on rubber tires was read by Mr. Fred'k W. Barker. In this paper the speaker mentioned the following characteristics which all pneumatic tires should possess.

1. Good material and workmanship.

2. Reinforcement of the tread to prevent punctures, but in such manner as not to detract from the free compression of the tire in a longitudinal direction.

3. "Stability" of the tread, or its uniformity of width of contact surface, regardless of road surface or the varying air pressure. In other words, according to the speaker, the tire should flatten, at its point of contact with the road, in a fore and aft and not in a sidewise direction.

After touching on the points of difference between pneumatic and solid tires, and the especial kinds of service for which each is best fitted, Mr. Barker describes as follows the process of making single tube tires, and concluded with a brief reference to anti-puncturing devices:

"A pole whose section corresponds with the required interior diameter of the proposed tire is provided, and is wrapped to a length equal to the circumference desired, with a strip of raw rubber of good quality to comprise an air holding tube. Next several plies of fabric, as many as may be necessary to afford the proper strength to the tire, are wrapped around the air tube. This fabric is calendared, or impregnated with rubber, so that it is really rubber cloth. The lug fastenings, which you have noted on your tires for securing them to the rims, have base plates which are inserted within the fabric at this stage, an incision being made in the fabric to expose the lug.

"The outer cover, being rubber compounded with other substances to make it durable, and incidentally to cheapen it, is then wrapped about the fabric. The rubber, being raw, is in a plastic state, so that the edges adhere and lie snugly in position. A small tube of pure rubber and fabric, called the valve stem, is inserted in the air tube, and it extends outwardly beyond the cover. The pole being withdrawn from the tire, the two ends of the latter are brought together and lapped to form a continuous tube; then some water is poured through the valve stem, into which what is termed a curing valve is inserted; the tire is inflated and is then placed within an iron mould framed in two halves and whose interior space is of exactly the proper dimensions and shape required.

"The mould parts, being securely bolted together with the raw tire between them, are then subjected to a heat of about 360 degrees for a period of about one hour. This being done, the tire is completed, and, the curing valve being removed, the usual valve is inserted in the stem and bound with wire.

"Of course, this process is varied by different makers, but in substance the steps I have described comprise the general method of making pneumatics.

"Owing to the bug bear of puncturing, some manufacturers advocate the increase in thickness of the walls to an extraordinary extent, leaving a very small space for the air. They contend that such tires are absolutely safe, and still do have a pneumatic cushion, although much diminished. . . . Other tire makers resort to all kinds of methods of tread reinforcement to obviate the danger of receiving punctures. Some have increased the folds of fabric at the tread to minimize the chances of a sharp flint, nail or other instrument of tire torture from penetrating to the air tube. Shellac and similar substances are used to make the tread impenetrable, and metal scales inserted between the layers of fabric have been used for the same purpose.

"Means like these, whilst enabling a tire to resist attack, have usually nullified the effect of their penetration resisting quality from the very fact that such quality has been attained at the cost of rendering the tread stiff and unyielding.

"However much one may dread a puncture, it is evident that immunity from this scourge will not be purchased at the price of loss of resiliency. Were it sufficient to strengthen the tread or contact portion of the tire alone, the effect would not be so bad, because, whilst the side walls of the tire are left pliable, the air cushion is fully operative. As a matter of fact, the corners between the tread base and the side walls are the most vulnerable parts of the tire, because the flattening at the tread which produces these corners, spreads them to form a widened base line, and stretches them invitingly for attack.

"To render the tire immune the armor should extend half way up the tire walls, and to so apply it would effectually destroy its other essential qualities.

"A problem therefore confronts us as to how to assimilate the desiderata of a tread that will yield freely and that cannot be punctured.

"I believe the solution of this problem lies in providing a tread armour in articulate form, so that while shielding the inner tube its ability to yield longitudinally is not impaired. You note the application of this principle in the tire having a band of wood vulcanized between the folds of fabric in the tread. The band is composed of a series of flat members having concaved sides, pivots fitting between each pair of flat pieces to close the interstices. This tread is quite flexible and does not detract from the resiliency of the tire, although as an armor it is difficult to conceive how its resisting quality can be improved."

Conditions of the New York to Buffalo Endurance Test.

The following conditions have been determined on by the Technical Committee and the Board of Governors of the A. C. A. for its endurace test this fall:

1. That a 500-mile endurance test of automobiles be held during the week commencing September 7th, 1901.

2. That the official route of the Trial be from New York to Buffalo, and that the trial terminate at Buffalo.

3. That the total distance be divided into "stages" for each day, on the basis of covering approximately 85 miles per day, but that the division of distance be left to the discretion of the committee:

	Miles.
1st Stage: From clubhouse to Poughkeepsie, approximate distance	90
2d Stage: From Poughkeepsie to Albany, approximate distance	70
3d Stage: From Albany to Little Falls, including a hill-climbing trial, near Little Falls, approximate distance	85
4th Stage: Little Falls to Syracuse, approximate distance	85
5th Stage: Syracuse to Rochester, approximate distance	90
6th Stage: Rochester to Buffalo, approximate distance	80
Total, approximate distance.....	500

The trial to start on Monday morning from the clubhouse and to finish at Buffalo on a Saturday afternoon on the same week.

4. That this contest be opened to all classes of self-propelled vehicles, but that no manufacturer, agent or private owner be allowed to enter more than three vehicles in any one class.

Classification and Division.

5. Vehicles shall be divided into five classes or divisions, and all four-wheeled vehicles shall carry two or more persons. Following are the classes:

Under 1,000-pound class: Four-wheeled motor vehicles weighing under 1,000 pounds, in commercial running and operating condition, with all tools, fuel and supplies on board.

1,000 to 2,000-pound class: Four-wheeled motor vehicles weighing between 1,000 and less than 2,000 pounds.

2,000-pound or over class: Four-wheeled motor vehicles weighing 2,000 pounds or over.

Motor Cycle class: Motor bicycles, motor tricycles and motor quadricycles.

Public service class: Public conveyances and freight conveyances. These shall carry a minimum weight of 750 pounds, exclusive of their driver.

6. That the conditions of this endurance test shall be average speed for the six days, and any competitor falling below an average of 8 miles per hour for any one period shall not receive any credit for that period.

Certificates shall be awarded by the club as follows:

A. Certificate, average speed from 12 to 15 miles per hour. B. Certificate, average speed from 10 to 12 miles per hour. C. Certificate, average speed from 8 to 10 miles per hour.

That no average speed in excess of 15 miles per hour shall be recognized.

Public service vehicles shall receive a certificate stating their average speed, which must not be less than 8 miles per hour, and the weight carried shall also be stated in the certificate.

7. All vehicles, whether electric, steam or gasoline, or otherwise, shall operate in the same class, divided only as designated by weight.

8 Controls are to be officially established at the start of each day's run, at the lunching places and at the finishing places of each day's run. The start is to be made each morning at 8 o'clock, and an hour and a half allowed for lunch.

9. Controls are also to be established on the hill-climbing trial near Little Falls, which trial will be a separate matter.

10. The test is to be under the charge of a committee to be designated by the club, and they to have entire charge of the details and control of the run from time of start to finish, and shall render their report to a Board of Judges of not less than three, who shall make the awards and decisions, such Judges to be appointed by the Board of Governors, and to be entirely disinterested from any manufacturer or allied interests in the automobile line.

11. The entrance fee for all classes, motor cycles excepted, shall be $50 for each vehicle. In the motor cycle class the entrance fee shall be $25 for each vehicle.

In addition to the above, provision is made for the issuance of an official catalogue giving detailed information as to the route, also for suitable guide posts along the route, these to be permanent and uniform with those proposed between New York, Boston, Albany and Philadelphia; also for the attachment of numbers and the securing of official co-operation in the towns along the route. The penalty for a vehicle being towed in any period is to be disqualification for that period.

A New "Gasmobile" Surrey.

The gasoline surrey shown in the accompanying illustration is the first of a new model produced by the Automobile Co. of America, Marion, Jersey City, N. J. The tendency toward European types of design, noticeable in previous models, is still more marked in this. The motor is still in the rear, being directly beneath the seat, but the transmission now comprises sliding gears instead of individual clutches, and the rear axle is solid, while the differential is placed in a countershaft which drives the rear wheels by independent chains. Two forward speeds and one reverse are used, and the motor, which is of the company's standard triple-cylinder design, is regulated by throttling. A single pedal disengages the clutch and applies the brake, and the gears are shifted by the hand lever in front of the steering wheel. The water and gasoline tanks are beneath the body at the rear and front ends, respectively.

A NEW "GASMOBILE" SURREY.

A Law for Connecticut.

A law to regulate motor vehicles has passed the Conecticut Legislature, and at this writing is expected to be signed. It imposes speed limits of 12 and 15 miles per hour in the town and country respectively, and calls for reduced speed at crossings. Local speed ordinances are forbidden, save that local permits may be issued for speeds higher than those named by the law. The penalty for violation is a fine of not over $200.

The Auto-Dynamic Hansom Cab.

The Auto-Dynamic Co., 140 West Thirty-ninth Street, New York, which builds electric vehicles embodying several novel features of design, has lately produced the hansom cab shown in the illustration. The low centre of gravity of this vehicle, gained by putting the rear springs at the side of the body instead of below it, is a noticeable feature. A rumble gives a seat for the driver. Transmission is by belt and chain, the two motors being carried in the body. The tires are of indurated fabric, claimed to be non-slipping and of high wearing qualities, and the battery, made under the company's patents, is claimed to have more than double the capacity per pound of ordinary lead cells.

THE AUTO-DYNAMIC HANSOM CAB.

A Creditable Run.

The Hasbrouck Motor Co. sends the particulars of a creditable run made in their 6-HP. two-passenger phaeton in the early part of last April. Starting from the factory at Piermont, N. Y., the course lay through Demarest and by the Schraalenburg road to Norwood; thence to Hackensack, by the Hasbrouck Heights road to Carlstadt, to Passaic, via Market Street Bridge to Paterson, to Arcola, Hackensack, Norwood, by Schraalenburg road to Tappan, and back to Piermont. The course was 70 miles long, including ten miles of mud so deep in spots as to be almost impassable to teams, and was covered in a trifle under five hours. No stops were made, except in Passaic for the purpose of showing the machine. Except for the mud referred to, the roads were good macadam, but hilly. Three and three-quarters gallons of gasoline were consumed on the trip.

Mr. H. C. Baxter has had recently built for him a "Mobile," which he will take aboard his yacht for use when not on the water.

The Automobile

Published at
150 NASSAU STREET, NEW YORK,
on the first of each month,
BY THE E. L. POWERS CO.

SUBSCRIPTION PRICE.

North America - - - - - - - - $1.00
Foreign - - - - - - - - - - 1.50

Advertising Rates Upon Application.

Address Communications to
THE AUTOMOBILE, 150 Nassau St., New York.

Entered at the N. Y. Post Office as second-class matter.

CONTENTS.

(Copyright, 1901, by The E. L. Powers Co. All rights to signed articles reserved.)

A Gasoline Touring Car.....121, 122
For an Annual Road Race..... 122
Automobiles in Central Park..... 122
The Century Steam Carriage. By Herbert L. Towle.....122, 123
The Variable Cut-off: How Far is it Practicable? 124, 125
The Steam Carriage as a Physician's Trap. By Frederic E. Sondern, M. D..... 125
From New York to Washington by Steam Carriage. By Mrs. F. P. Avery..... 126
The Edison Storage Battery.....126, 127
A Motor Stage Line on Long Island..... 127
A Historic Lawsuit Up Again..... 127
To Supply Many Supply Stations..... 127
Something About Tires 128
Conditions of the New York to Buffalo Endurance Test 128, 129
A New "Gasmobile" Surrey 129
A Law for Connecticut..... 129
The Auto-Dynamic Hansom Cab..... 129
A Creditable Run 129
Editorials 130, 131
- Pan-American Number July 1.
- An Omission to be Rectified.
- The New Edison Storage Battery.
- Emergency Brakes and Regular Brakes.
- The Club's Plain Duty.
- Popular Hostility and Lever Steering.
- To Legitimize Road Racing.
- Alcohol in Gasoline Motors.

Columbus to Cleveland. By Campbell M. Chittenden 132
A Gasoline Piano Truck..... 132
Club News and Views..... 133
- Club Directory.
- A Policy of Conciliation.
- In Charge of the Endurance Test.
- Will Employ Pacemakers.
- Rhode Island Automobile Club.
- A New Sports Committee.
- Automobile Club of Cincinnati.
- A Club in Herkimer.
- The Troy Automobile Club.
- Buffalo Automobile Club.

A Long Automobile Ride 133
Correspondence..... 134
- Where Kerosene is Needed.

An Electric Vehicle in Police Service..... 134
The Trend of Continental Progress..... 134
Improving the Sprag..... 134
The Cottereau Voiturette 135
The Paris-Roubaix Alcohol Trial..... 135
A Harrowing Experience 136
Putting Up Sign Posts..... 136
Saving the Tires..... 136
The Paris-Berlin Race 136
Control Contest by the English Motor Club. 136
The De Loura Balanced Engine..... 136
The Maltby Motor Bicycle..... 136
Wanamaker Opens an Auto School.....136, 137
The Stevens Non-Slipping Tire..... 137
Business News 137
Patents 137
Advertisements.....137, 138, 139, 140, 141, 142, 143, 144

Pan-American Number July 1.

Owing to the unanticipated failure of most of the automobile exhibitors to be ready on time, the Exposition Number of THE AUTOMOBILE has been postponed till July. The month's delay, however, will only result in making it more complete and more valuable. In addition to the technical report, it will contain a finely-illustrated account of the exposition in general, and a carefully edited list of routes for visiting automobilists from all the principal cities within touring distance of Buffalo. The accommodations in Buffalo for motor vehicles will be given also, and no expense will be spared to make our July issue the most complete and useful one in the field for the up-to-date automobilist.

An Omission to be Rectified.

A comparison of the rules governing the New York to Buffalo endurance test in September with those of the 100-mile test of the Long Island Automobile Club, published in our March issue, suggests several interesting points regarding what can be attempted in this direction on a large scale. In the shorter contest the awards were based wholly on the duration of stops. Speed, within defined limits, was not a factor, and stringent regulations were enforced against scorching. All this was made possible by the fact that a timekeeper could be assigned to each vehicle.

The moral impossibility of obtaining a trustworthy timekeeper for each machine in the longer test necessitates the abandonment of any attempt to record the stops, and leaves nothing, practically, but the average speed on which to base awards. Thus far no exception can be taken to the work of the Technical Committee; but we cannot escape the conviction that it will be a serious error to merely ignore speeds in excess of a certain limit, in the hope of persuading competitors not to pass this limit. The practical effect of the clause covering this point, as it now stands, will be to permit, if it does not encourage, the entry of a lot of machines for the sole object of making road records; and the virtuous operators will be "left at the post," with a certificate for their sole reward.

A single machine, out for a record, may be endured; but what will be said in Herkimer and Wayne to the irruption of twenty or fifty such? It is of the utmost importance this year that the up-State districts be given not even a fancied cause for suspecting the good faith of the A. C. A. in the matter of speed regulation, else we may look next session for such an onslaught on the Doughty law as will amend it out of existence. It should be a simple matter to provide pacemakers throughout the run, and to penalize by disqualification for that period any vehicle failing to start at the appointed hour. If this is done, it only needs to disqualify absolutely any machine passing the pacemaker, on the first offence, and to suppress thereafter all official records concerning it, to control the scorchers effectually. In the absence of official confirmation of the speed claimed by them, they will have little inducement to break the rules.

The New Edison Storage Battery.

From the address by Arthur E. Kennelly before the American Institute of Electrical Engineers, of which an abstract is given on another page, it is evident that the battery which will bear Edison's name commercially is not the one recently patented in England, with active materials of cuprous oxide and cadmium. The new battery has nearly treble the electro-motive force of the other, and on the face of it appears to be much more practical as regards its material and construction. The extreme lightness of the cell will be apparent from its construction; and if, in addition, it meets expectations in regard to durability, and life under hard usage, it is not too much to say that it will increase enormously the field within which electric vehicles can be applied. It may even prove, rather than the more mechanical prime movers, to offer the ultimate solution of the problem of urban haulage. Engineers have often declared that to find the perfect storage battery it would be necessary to get away from the lead cell altogether; and we may regard it as an auspicious sign that a successful step in this direction has apparently been made.

Emergency Brakes and Regular Brakes.

Why is it that manufacturers so generally make the regular brake of a motor carriage work on the differential, while the emergency brake acts on the rear wheels? The operator gets in the habit of using the regular brake, which is invariably made handier to apply, and in the two kinds of emergencies when he most needs a brake—a sudden skid or an unexpected obstacle just in front—he has to waste time reaching for a lever or the like before his emergency brake is applied, if indeed in the confusion of the moment he does not forget the latter altogether. The brake on the differential is positively dangerous on a wet surface, and yet the driver will probably use it instead of the other from sheer force of habit and because the position of the emergency brake handle makes impossible a state of instant preparedness with it. Again, the wheel brakes are much more powerful than the regular brake, and this of itself would often mean salvation in the case of a child running out into the street or of a wagon or pedestrian encountered on suddenly turning a corner. On the other hand, the emergen-

cy brake, considered simply as an auxiliary, which it would be if it acted on the differential, would be chiefly needed in case of descending a long hill or of failure of the regular brakes, and seldom or never would be called upon in making an emergency stop. Is there any good reason why the two brake systems should not be interchanged?

The Club's Plain Duty.

It is to be hoped that the Automobile Club of America will show more backbone in enforcing its recent resolution to have all club runs paced at lawful speed than it has thus far displayed in enforcing that other resolution, of brief life and blessed memory, to suspend or expel any member found guilty of scorching on the highway in disregard of the public's rights. Reports are conflicting regarding the runaways or actual damage caused in the course of one or two of the club's recent runs, but it is nothing less than scandalous that such an occasion should be used by any manufacturers to advertise the speed of their machines. If the club cannot hold a run without some one the next day publicly announcing that he made a speed of thirty-five or forty miles an hour in the course of it, the fewer club runs are to be held the better it will be for the club, and we cannot see that matters are greatly improved if on official investigation it proves that the reported speed was a fiction. The mischief is done, for no newspaper will give the correction equal publicity with the first account.

Popular Hostility and Lever Steering.

It is a not infrequent complaint among novices with carriages steered by tiller or side lever that the vibration of the steering handle becomes very fatiguing on a rough road. Many operators profess to experience no difficulty in this regard, and doubtless many others learn to manage the steering bar with less trouble than they at first thought possible. We have lately heard it suggested by a gentleman who, although not himself an automobilist, has exceptional opportunities for observation on the road, that a considerable fraction of the hostility to the automobile among farmers and others on country roads is owing to the inability of some operators, on account of this vibration or merely because of their own inexpertness, to steer a decently straight course. A machine bounding along at top speed, with its driver evidently needing the whole of a twenty-foot road to save him from the ditch; a chauffeur so little certain of his helm as to prefer crossing the road to steering for a ten-foot opening between teams; a vehicle tearing down hill into a village with throttle wide open, its steering bar vibrating like a corn-popper and the driver clearing the road with his horn, —such spectacles as these are certainly not calculated to implant amicable feeling in the breasts of other users of the road; and yet our friend assures us that they are incidents of frequent occurrence within his notice. Doubtless in many cases, as it should be in all, the lack of control is only apparent; but whether it be seeming or real, who can help feeling angry at the man who wants all the road, and relies on his superior momentum to get it?

To Legitimize Road Racing.

The late action of the Board of Governors of the A. C. A. at length sets at rest the conflicting reports regarding the club's attitude towards road racing in general and the Erie to Buffalo race this fall in particular. Although from all indications we may look for a lively war of opinion, as to whether or not the decision of the club to organize an annual long distance road race is a wise one at the present time, it should not be forgotten that one of the purposes of the club, as set forth in its articles of incorporation, is this very matter of race control, so that the club is now merely assuming one branch of its proper activities. Nor is this action inconsistent with its deprecation of promiscuous speeding on the public highways. It is expressly declared that the consent of the local authorities will be obtained in selecting the course; the route will be properly policed and guarded, and in New York State at least special permission for such an event can be given without infringement of the highway law. If the public directly concerned does not object to such a race, it is difficult to see why anyone else should.

That road racing is of very real value to the industry cannot be disputed. More than any other one thing, it has been instrumental in bringing about the wonderful increase in the efficiency of Continental machines of recent years. There is still far too much useless weight in American machines, and no kind of competition will be so effective in reducing this—by the general use of the highest grade instead of the cheapest material, by the scientific distribution of metal, and by designs which minimize rigidity and thereby permit road strains to be distributed instead of concentrated—as the strenuous competition wherein every pound of weight tells its story, and every loosened nut, doubtful joint, or ill-proportioned spring publishes throughout the country the shortcomings of that machine. Except the ratio of weight to power, none of this is shown by track racing, and the track machine is fit for nothing on the road, whereas oftentimes the difference between the road racer and the touring car is merely one of body and ratio of gearing. Nor can the endurance test accomplish the same result as the road race. If sufficiently protracted, it is good evidence of the reliability or otherwise of the machines, but what is demanded is not only a reliable but an efficient machine, one which will carry its load and make its speed with the smallest outlay of power. The French voiturette of to-day will do more than the road machine of eight or even five years ago, and is more durable and far less costly.

To the automobile clubs belong not only the defense of the automobile from unfair attack, and the supervision of automobile speeds in the interests of the public at large, but the development of the industry by well-regulated technical competitions, including road races where these can be arranged, as well as the more common endurance contests. We hope that the A. C. A. will be successful in carrying out its program.

Alcohol in Gasoline Motors.

In our January issue we gave some figures regarding the fuel consumption per 100 pounds per mile, as shown in a 43-mile consumption contest from Suresnes to Meulan, France. In that case, however, the weight given was that of the vehicle alone, since for some reason those in charge of the test took no account of the passengers carried. But in the Paris-Roubaix alcohol contest, described elsewhere in this issue, both the weight of the machine and the total weight were recorded, and the latter was made the basis of the consumption record. As the two tests were held over different routes, some caution should be used in making comparisons, but in general, making allowance for the different methods of arriving at the results, the difference between the fuel consumption with gasoline and with the 50 per cent. mixture is certainly very small. The important fact brought out by the event is that an addition of no small consequence has been found to the visible supply of motor fuel, and with the increasing mastery of its peculiarities it may be expected ere long to take equal rank with gasoline in Continental Europe. There is certainly no immediate likelihood of alcohol being soon adopted as a fuel in this country, where gasoline is far cheaper than abroad, but the effect of its use in France will nevertheless result beneficially for the supply and price of gasoline in this country as well.

The result of the Gordon-Bennett international cup race is announced just as we go to press. Only the French entries started, and of those Girardot won. His time was beaten by Fournier, in a 35 h. p. Mors machine. The latter, who was entered in the Paris-Bordeaux race over the same course, made the 348 miles in 8:44:44, including stops and slow-downs. A full account will appear in our next issue.

The Automobile Club of Chicago is projecting a tour to Buffalo in August, taking some eight days to reach their destination.

Columbus to Cleveland.

By Campbell M. Chittenden.

The distance from Columbus to Clevland over the best route is about one hundred and seventy miles. The distance might be lessened by short cuts, but it would be at the expense of time and pleasure.

Starting from Columbus, the first objective point is Delaware, about 25 miles north. The driver has a choice of two roads; one along the west bank of the Olentangy river and the other along the high ground on the east side; the former is much pleasanter in pleasant weather but the latter is the better during or just after rain. Delaware has good hotel accommodations for a town of its size (about 10,000 population) and of course bicycle repair shops, etc. Leaving Delaware we start first north and then bear toward the east to Mt. Gilead, passing through Westfield and Cardington. This road is nearly all gravel pike and good in any sort of weather, being also free from any grades worth consideration. There are three or four roads from Mt. Gilead to Mansfield, none of which I have ever found to be very good. Probably the best is by way of Shaucks and Lexington. The surface would be fair in fair weather and the grades not very steep. When muddy, the road is very sticky and heavy.

Mansfield makes an excellent place to spend the night, being almost exactly half-way to Cleveland and possessing an excellent hotel, etc. Except under the most favorable conditions, I do not think it would be possible to make the whole trip from Columbus to Cleveland in one day without undue exertion and discomfort, and I have always stopped at Mansfield, both going and coming.

The worst part of the whole road is in this country on both sides of Mansfield, and in bad weather it is something terrific. In a gasoline six horse power carriage I have been compelled to travel on the lowest gear, even when going down grade, the mud held the wheels so. it is only 17 miles from Mansfield to Ashland, and the chauffeur has a choice of two roads; whichever one he takes he will probably wish he had taken the other. Going from Mansfield, I should take the road through Olivesburg, but coming from Ashland I believe the other through Windsor is preferable. This is because some hills on the latter route would be very hard to climb, going north, but one can come down them without much difficulty.

The shortest road from Ashland to Cleveland is by way of Medina, but it is much better in my opinion to take the longer road which goes through Oberlin and Elyria. This is a very good road, with moderate grades and gravel surface or hard clay until Elyria is reached. If the tourist does not care to go through Oberlin for the sake of seeing the town, the college and so forth, which will quite repay the time unless one is in a hurry, he can make a short cut by turning a little to the east at Pittsfield Center and going directly to Elyria over a good road. Elyria is a town which does not need a speed ordinance, as it is paved to a great extent with large slabs of stone, each having a surface of from fifty to one hundred square feet. The edges have become worn and the stones worked a little out of true, so that the effect of riding over them may be better imagined than described. There is a very good hotel at Elyria.

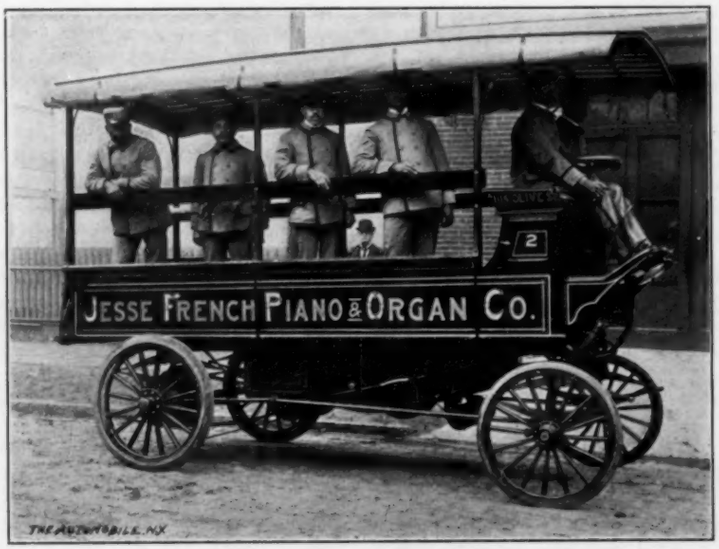
From there to Cleveland is about 25 miles by way of Dover. The sand from which the rest of our route has been almost entirely free is very heavy here; sometimes for quite long stretches it is so soft that the wheels sink into it to the depth of eight to twelve inches. There is a bicycle side-path across a ditch from the road and I have often straddled the ditch and run with one wheel on the path and the other on the road. Naturally a person does not make very fast time under such circumstances, and I think the traveller will give a sigh of relief when he finally strikes the paved streets of Cleveland, which stretch out four or five miles from the center of the town.

Speaking generally of the trip, which I have made several times, I should not like to attempt it again except in good weather. I have always had rain and mud when I have taken it, and had to ford creeks where the bridges were down and go through fields where the road was washed out or being "repaired," as the natives call heaping soft mud and clay upon it. The scenery along the hilly portions of the way is fine, and where the scenery is not so attractive, the road is usually better. There is no trouble about getting gasoline at any of the small towns which are scattered very thickly along the route, and if a person's tank only held supplies for twenty miles he should have no trouble on that score. Furthermore gasoline tank wagons drive through the country, and I have found it a good plan to stop them when we meet, for their gasoline is sure to be fresh and lively.

As I said before, I think it would take any driver parts of two days to make the trip, and I believe the best plan is to leave Columbus about the middle of the morning, stop at Mansfield at night and get to Cleveland some time the next afternoon. Another thing—roads change very much in this part of the country from one year to another, and the road which I found bad last year, may be good this, and vice versa.

A Gasoline Piano Truck.

The illustration below shows a gasoline truck built by the St. Louis Motor Carriage Co. for piano delivery. It has a double cylinder engine of 15 h. p., and two changes of gear give speeds up to fifteen miles per hour, with reverse. The drive is by centre chain to a live rear axle. The gasoline consumption is stated as about one gallon to nine miles. With tanks filled the wagon weighs 3,660 pounds, and will carry a 3,000-pound load. It is in daily use by the Jesse French Piano and Organ Co., and takes the place of two-horse trucks. In six weeks of service it is reported to have covered over 800 miles.



THE ST. LOUIS GASOLINE PIANO TRUCK.

The Automobile Club of America held a run on May 11 from Jersey City through Danville to Morristown, N. J., and back by way of Elizabethport. The event early developed into a speed contest, and one member, C. J. Field, was caught and fined ten dollars at Morristown.

CLUB NEWS AND VIEWS

Club Directory.

Automobile Club of America, S. M. Butler, Acting Secy., 753 Fifth Ave., New York City.

Automobile Club of Baltimore, W. W. Donaldson, Secy., 872 Park Ave., Baltimore.

Automobile Club of Bridgeport, F. W. Bolande, Secy., 49 Cannon St., Bridgeport, Conn.

Automobile Club of Brooklyn, C. Benton Dix, Secy., Hotel Clarendon, Brooklyn, N. Y.

Automobile Club of Cincinnati, R. H. Cox, Secy., Cincinnati, O.

Automobile Club of Columbus, C. M. Chittenden, Sec., Broad St., Columbus, O.

Automobile Club of New England, Geo. E. McQueston, Secy., Brookline, Mass.

Automobile Club of Rochester, Fredk. Sager, Secy., 66 East Ave., Rochester, N. Y.

Buffalo Automobile Club, Ellicott Evans, Secy., Lenox Hotel, Buffalo, N. Y.

Chicago Automobile Club, H. M. Brinckerhoff, Secy., Monadnock Block, Chicago.

Cleveland Automobile Club, L. H. Rogers, Secy., Cleveland, O.

Columbia College Automobile Club. Lewis Iselin, Secy., Col. College, New York.

Indiana Automobile Club, August Habich, Secy., Indianapolis.

Long Island Automobile Club, C. W. Spurr, Jr., Secy., 552 State St., Brooklyn.

Massachusetts Automobile Club, L. E. Knott, Secy., Ashburton Pl., Boston.

New Bedford Automobile Club, E. G. Watson, Secy., New Bedford, Mass.

New Jersey Automobile Club, Dr. H. Power, Secy., Upper Montclair, N. J.

North Jersey Automobile Club, E. T. Bell, Jr., Secy., Paterson, N. J.

Philadelphia Automobile Club, Frank C. Lewin, Secy., Hotel Flanders, Phila., Pa.

Pennsylvania Automobile Club, H. J. Johnson, Secy., 138 N. Broad St., Philadelphia.

Rhode Island Automobile Club, F. A. Fletcher, Secy., 42 So. Water St., Providence.

San Francisco Automobile Club, B. L. Ryder, Secy., San Francisco, Cal.

Troy Automobile Club, J. S. Thiell, Secy., Troy, N. Y.

Worcester Automobile Club, H. E. Sheiland, Secy., Worcester, Mass.

A Policy of Conciliation.

Believing that those who ask the most are not always those who get the most, the Long Island Automobile Club has passed a resolution instructing its members to refrain from using the east drive of Prospect Park, Brooklyn, and requesting other automobilists to do the same. The east drive has hitherto been barred to motor vehicles, and it is the sense of the club that there should be some portion of the park where ladies and unpractised drivers can go without danger of meeting automobiles.

In Charge of the Endurance Test.

On completing its work of formulating the conditions governing the New York to Buffalo endurance test the Technical Committee of the A. C. A. recommended that, as several of its members were manufacturers and would practically have entries in the test, the actual conduct of the event should be entrusted to a special committee not identified with the manufacture of automobiles. In compliance with this request, the Board of Governors has appointed Messrs. W. M. Power, W. E. Scarritt and Harlan W. Whipple a committee for this purpose, and these gentlemen have entire charge of the regulations in detail governing the contest.

Will Employ Pacemakers.

On account of the excessive speeds indulged in by certain members in club runs, and the popular resentment thereby aroused, the Board of Governors of the A. C. A. adopted on May 21 a resolution requiring that all future runs of the club should be led by a pacemaker, who should not exceed the legal speed, and that any member passing the pacemaker should be suspended for the first offense and expelled on the second.

Rhode Island Automobile Club.

The Rhode Island Automobile Club will about September 1 remove its club quarters to the new Crown Hotel, which is being built from the Athletic Club structure. There will be two rooms, handsomely finished in quartered oak, the larger to serve as a reading and meeting room, and the other to be used as a dining room, where meals will be served from 6 A. M. to 12 M. Other arrangements will soon be made for a club stable in the vicinity of the hotel.

A New Sports Committee.

On account of the identification of some of its members with manufacturing interests, the committee originally appointed to have charge of the work of automobile sports at the Pan-American Exposition in September has resigned, and in its place the following committee has been named: Messrs. Albert C. Bostwick (chairman), D. C. McCoy and John Aspinwall, of the A. C. A.; and Dr. Truman J. Martin, of the Buffalo Automobile Club.

The Rochester Automobile Club will put up sign posts, similar to those of the A. C. A., along the main highways through Rochester, and in particular along the east and west route to be followed in the New York to Buffalo endurance run in September.

Automobile Club of Cincinnati.

The Automobile Club of Cincinnati has been formed with the following officers: President, R. A. Holden; vice-president, Howard Rodgers; secretary, R. H. Cox; treasurer, T. C. Meadows; Board of Governors, R. A. Holden, Howard Rodgers, Col. Max Fleischman and Dr. L. S. Colter.

A Club in Herkimer.

Steps have been taken looking to the formation of an automobile club in Herkimer, N. Y. A meeting of automobilists and others interested was held at the Palmer House May 13, where committees were appointed to nominate officers and draft the constitution and by-laws.

The Troy Automobile Club.

An automobile club embracing Troy and the adjacent towns has been organized at Troy, N. Y. The following officers were elected: President, Alonzo McConihe; Vice-President, C. E. Shacklady; Secretary, J. S. Thiell; Treasurer, Augustus Veghte.

Buffalo Automobile Club.

The Tours and Runs Committee of the Buffalo Automobile Club has undertaken the work of collecting and compiling information regarding routes for tourists in the neighborhood of Buffalo, for the benefit of club members.

Steps have been taken looking to the formation of an automobile club in Jersey City, to be known as the Hudson County Automobile Club. The organization will soon be completed.

A Long Automobile Ride.

Mr. and Mrs. Robert Shaw, of Chicago, recently made a trip from New York to Chicago, in an 8 h. p. Panhard touring carriage, covering the distance of over 1,000 miles, in ten days, eleven and one-half hours, with ninety-seven hours on the road. It is reported that a friend of Mr. Shaw had wagered a silver cup that he could not make the trip in twelve days. The second day out it began to rain, and this kept up for four days, interfering considerably with their speed. Two tires were worn out on the trip, and the driving chains likewise needed to be replaced. One hundred and ten gallons of gasoline are reported to have been used.

The first stop was at Fishkill, N. Y.; second, Albany; third, Herkimer; fourth, Syracuse; fifth, Clifton Springs, sixth, Buffalo; seventh, Conneaut, Ohio; eighth, Oberlin, Ohio; ninth, Ligonier, Ind. Beyond Buffalo the stages averaged close to 140 miles a day to make up for the poor time in the early half of the trip.

Correspondence.

Space will be given on this page to letters concerning the Automobile, its operation or construction, to accounts of tours or runs, routes of travel, good roads, etc. When requested by correspondents their names will not be published, but must always be given in the communication to the Editor.

Where Kerosene is Needed.

Editor THE AUTOMOBILE:

As a subscriber to your very interesting paper, can you or any of your readers inform me of any motor car available for use in a tropical country like Ceylon? The question may seem somewhat absurd, but the difficulties are these: Most cars, apart from electric ones, which are out of the question here at present, seem to derive their power from petrol or gasoline—even the steam cars use it, or them, as a heating agent. There lies the difficulty—neither petrol nor gasoline, or any oils of such (presumably) low-flashing point are permitted to be landed in this country. The heat in the shade in the low country of Ceylon is never below 85° Fahr. by day, and frequently well over 90°. As far as I can see, the only admissible motor would be one capable of burning such oil as bulk kerosene, or, better still, American "Daylight" oil. Are there any such cars in use? We have many oil engines in use on estates, but all use the bulk kerosene, which is dirty, to say the least of it. Apologizing for the length of this letter and hoping for some information, I am, &c.,

TEA PLANTER.

Natale, Ceylon, April 20.

An Electric Vehicle in Police Service.

A police patrol wagon will shortly be added to its regular line by the Electric Vehicle Co. Pending delivery of this model, the Police Department of Hartford, Conn., is using the Mark XI wagonette, shown in the accompanying cut. This vehicle is equipped with a pair of emergency brake bands on the outside of the two internal gears on the rear wheels, by which it may be quickly controlled at full speed. These brakes are operated by the forward lever at the operator's left.

Besides the driver, the wagon carries eleven passengers, and has a rated mileage with the new "Exide" batteries of 35 miles. There are 44 cells, weighing 1,860 lbs., and the total weight is 4,850 lbs. A single motor of 4 nominal h. p. drives both rear wheels, the motor shaft containing the differential and carrying a brake for ordinary use.

AN ELECTRIC VEHICLE IN POLICE SERVICE.

The Trend of Continental Progress.

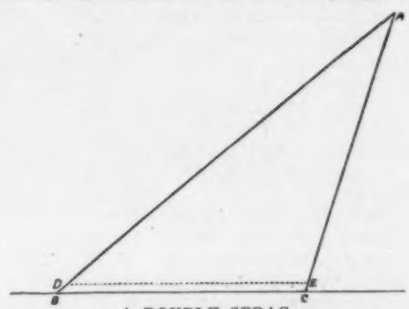
Mark Mayhew, a well-known English motorist, was one of many to visit Nice during automobile week in March, and on his return he reported his observations quite fully. As the "Nice Week" attracts the flower of Continental automobilism, the following is worth quoting:

"The most noticeable point, perhaps, from an Englishman's view, was not so much the engine power of the cars as their remarkable lightness. * * * The latest manufactured type of Panhard is 20 HP. nominal, said to develop about 30 HP. on the brake. These cars weigh under a ton in racing carrosserie, and are supplied with change of speed and direction all on one lever, startlingly small gear, and a few improvements in the usual type of engine. Their speed was considerable, but not so great as the "Mercédès," owing to the smaller engine. There were one or two big Mors carriages of not less than 45 B. HP., which were probably really the fastest cars there. The failure of Mors and Panhard in the races was undoubtedly due very largely to a number of little mishaps, such as slipping clutches, troublesome pumps, etc., which might easily have been avoided by more care on the part of the makers in turning them out, and by their owners by trying them thoroughly before the start. Rochet-Schneider have brought out an extremely well made 24 HP. car which does them great credit and looks as if it would last. * * *

"I could not see all of these magnificent automobiles without drawing some important conclusions and making a few remarks upon some of their peculiarities. Their great feature is unquestionably their lightness. This in itself does away with the need for so much strength, as the cars bob over lumps and bad places in the road like a cork instead of dashing against or crashing into them, as is inevitably the case with a heavy car. The result of this is that in springs and tires there is an enormous saving. In order to illustrate here what is being done in France and also to get further experience myself, I bought a 20 HP. Panhard just out of the works which had been sent to Nice, and drove it home. The tires would surprise any one who examined them, being practically without cuts, the tread being worn to a nice fine sand-paper surface all the way round after a journey of 1,000 miles. Another point which is being made much of by the Continental manufacturers is the power of the foot-brake. This can be relied upon to stop the car under almost any circumstances, so that one may go at pretty well full speed down a winding mountain road and pull up easily for turning the bends. To compare the fitting, however, of the foreign cars with that of the English would be, in my opinion decidedly in favor of those produced by our manufacturers. Much more care appears to be taken before the English car leaves the shops. It is also necessary to point out that the racing cars I have spoken of are not expected to go through more than two or three long races. A big overhaul would be necessary after each race, and future purchasers know, or at least find out afterwards, that they require a great deal of attention."

Improving the Sprag.

As those drivers know whose machines are dependent on a sprag to hold them in case of stoppage on an ascent, the ordinary sprag is not always reliable, as it will sometimes slip on a hard surface, and, if made steep enough to take hold under all circumstances, the machine is liable to "jump" it at a critical moment. To prevent this, two British motorists, W. R. Pidgeon and E. F. Bradley, have hit on the device of a double sprag, as



A DOUBLE SPRAG.

shown in the sketch. The regular sprag, AB, is supplemented by a second and shorter one, AC independently pivoted at the same point A. The two are connected by a stout chain DE, and when they trail on the ground, in going up a hill, there is about 2½ miles of slack in the chain. Consequently, if the car starts backward, the short sprag catches instantly, and by the time the slack in the chain is taken up it has a grip which can be trusted to pull in the long sprag, which then does the holding.

The short sprag should be given a slope of about 60 degrees with the ground when trailing.

The Cottereau Voiturette.

A good example of modern French practice in light carriages is the Cottereau "voiturine" of 7 HP., one of several sizes built by Cottereau & Cie., Dijon, and shown in the accompanying illustrations from La France Automobile.

The main frame, Fig. 2, is brazed up of steel tubing, and rests on four-semi-elliptic springs. An inner frame of tubes, c c and f, carries the motor h' h', which has two cylinders inclined at an angle of 42° from each other, somewhat like the early Daimler motors. A flywheel back of the crank case contains a conical clutch, from which the shaft runs back to the transmission gear case, Fig. 3. The latter is made in halves of aluminum, with a small cover, g (Fig. 2), to facilitate inspection. The driving shaft is at the bottom, and the sliding "carriage" of three pinions slides on its squared portion, while a helical spring and adjusting screw, h, press the shaft and connected clutch into engagement at the flywheel. The gears are of tempered steel, and give three forward speeds and a slow reverse, the latter being completed through a long intermediate pinion, i, carried in a swinging yoke, which is pressed down against the spring m by a heel plunger, till the pinion is in mesh at one end with the driving pinion and at the other end with the gear.

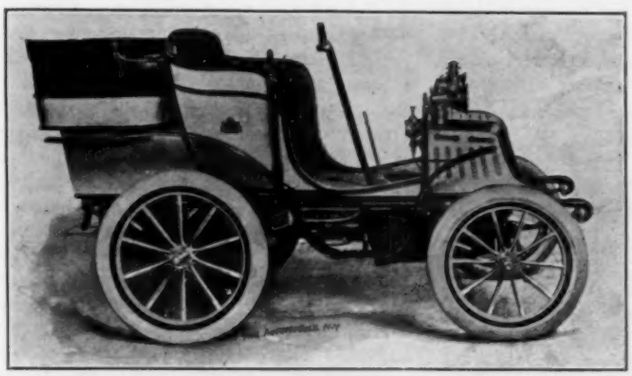


FIG. 1. THE COTTEREAU VOITURETTE.

From the driven shaft a pair of bevel gears transmits motion to the countershaft r, having a sprocket pinion on one end and a brake drum, o, on the other. A chain to the differential drum completes the transmission, and there is a brake band on the differential as well. As in the Panhard system, a pedal disengages the clutch, and a second pedal, acting on the brake o, releases the clutch at the same time. A lever under the right hand applies the second brake. Steering is by a handle bar, with one up-turned handle, and a short lever at the left hand and parallel with the steering column shifts the speed-changing gears. On the back face of the dash are mounted the handles controlling the carbureter, ignition and supply of lubricating oil. The muffler t is at the rear of the frame, and the water and gasoline tanks are under the seat.

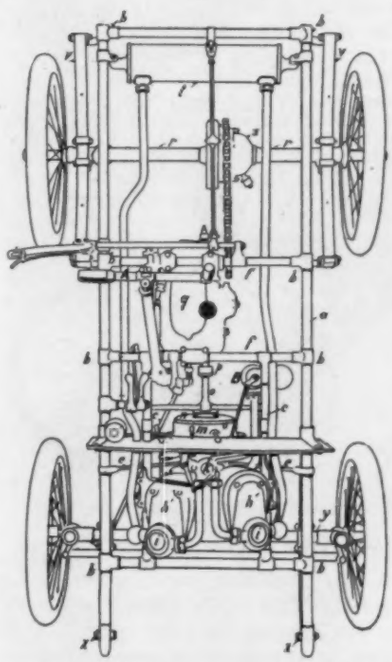


FIG. 2. THE FRAME AND MACHINERY.

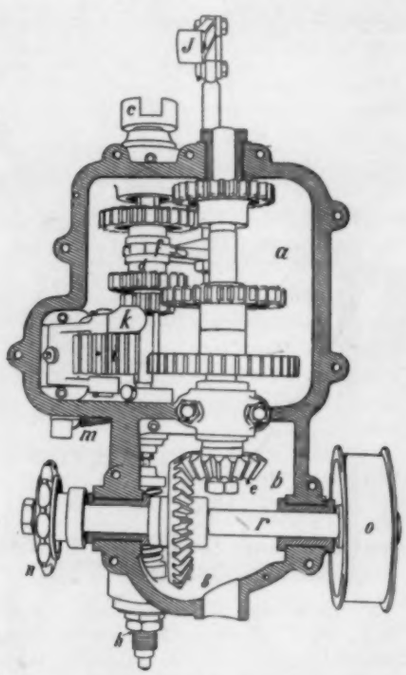


FIG. 3. THE TRANSMISSION GEARS.

The Paris-Roubaix Alcohol Trial.

A noteworthy consumption test, to determine the commercial practicability of using alcohol as a compound, at least, in the fuel of explosion motors, was held in France last April, over the course from Paris to Roubaix. This route is not a short one, being 172 miles long, and the competitors, of whom fifty-one started, were given their choice of one or two days to cover it, speed not being a factor in the awards. Twenty-nine chose the longer time, while twenty-two started the next day; and forty-eight arrived at Roubaix within the prescribed time.

The fuel used by nearly all was a mixture of equal parts of alcohol and benzine, and the consumption of this mixture appeared to be but little greater than that of gasoline alone, whereas the consumption of pure alcohol is approximately 50 per cent. greater. On this account and by reason of the heavy excise duties on the pure product, the latter is quite impracticable as a fuel, whereas it is found that at present prices the 50 per cent. mixture costs no more than gasoline—i. e., about 40 to 45 cents per gallon.

Coming to the actual consumption, this has been worked out to litres per (metric) ton-kilometer, and we have reduced the highest and lowest figures thus obtained in each class to fractions of a gallon per 100 pounds per mile, the weight in this case including the load carried.

Maker.	Total weight, kilos.	Consumption, litres.	Cons. per 100 lbs. per mile, gals.
Class A.—Quadricycles. Three Finished.			
1. De Dion	335	7.25	0.00146
3. De Dion	385	22.46	.00613
Class B.—Light Voiturettes. None Finished.			
Class C.—Voiturettes, 550 to 880 lbs. Six Fin.			
1. Darracq	570	18.00	.00232
6. Decauville	550	37.25	.00464
Class D.—Light Voitures, 880 to 1,430 lbs. Twelve Finished.			
4. Gillet-Forest	725	22.85	.00232
12. Decauville	599	64.45	.00754
Class E.—Voitures, 1,430 to 2,200 lbs. Twelve Finished.			
1. Delahaye	925	24.00	.00177
12. Gillet-Forest	840	38.500	.00293
Class F.—Heavy Voitures, above 2,200 lbs. Ten Finished.			
1. Societe Nanceenne	1,325	33.00	.00172
10. Gobron-Brillie.	1,260	50.50	.00276
Class G.—Commercial Wagons. Two Finished.			
1. Georges Richard	1,735	70.00	.00275
2. Bardon (pure alc'h'l)	1,445	49.00	.00233

In general, the larger machines were relatively the more economical, but the two quadricycles formed an exception. The first, driven by Cormier, averaged only 11½ miles per hour, and was very skilfully handled, while Osmont, the other driver, raced all the way, averaging 31 miles an hour, with no regard to his fuel consumption. There was no trouble in any of the motors due to the fuel used, but many of the operators afterwards declared that a special carbureter was needed for the best results.

M. Georges-Thadee Bouton, of the firm of De Dion, Bouton, et Cie, Paris, has been named a member of the Legion of Honor.

A Harrowing Experience.

"Le Velo" tells the sad story of two automobiles, a motor wagon and a bus, which essayed a trip through the Soudan desert.

In January, 1899, it says, the two machines were started from Kayes, their destination being Bamako, 200 kilometers (125 miles) distant. The first stage was made on a truck, and wagon and bus were conveyed, slowly, but surely, to Dioubeba.

Then the test began. Bus and wagon traveled on their own power to Toukoto, forty-five miles. It was a veritable crucifixion; the two machines arrived mere wrecks. The gears were literally ground away by the sand; the cylinders themselves were horribly abraded. The wagon was lopped off—abandoned—and its motor was added to that driving the bus.

On the road to Kita, sixty miles, it was yet worse. That town was reached, but with motor and transmission reduced to scrap. Nevertheless, it was necessary for business reasons to get to Bakumo. Mules and asses were impressed into service to finish the journey. Unhappily, it became necessary to revictual the caravan, and the mule-motors were soon no more.

A long wait! The desert was scoured and thirty-two negroes were found, whose lusty efforts combined to produce an anthropomobile motor, not of 32 horsepower, certainly, but able to assure a traction slow but sure. In March (of the same year, we are glad to say) the bus made an end of its journeyings at Bamako, where an engineer despatched in haste the good, the amazing news of its arrival. Its condition was such that no one thought of a return journey. They built a shed around the wreck, and forgot—happy detail—to give the shed an exit.

In July, 1900, the one-time automobile still slept in its protecting tomb.

Putting Up Sign Posts.

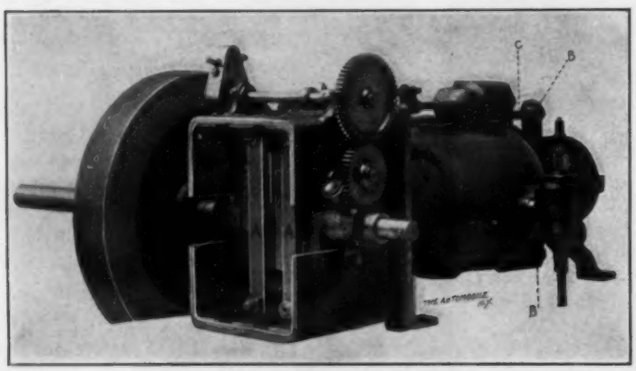
The automobile Club of America has begun putting up sign posts on the road to Bridgeport and in conjunction with the Long Island Automobile Club it is covering also the principal Long Island routes.

Saving the Tires.

Mr. M. Grahame-White, the hero of two more or less thrilling exploits in handling automobiles with disabled steering gear, lately gave another practical example of his resourcefulness. While taking several friends on a trip in a twelve horsepower Daimler, his two rear tires burst. Sooner than send the party home by carriage, he procured two pieces of heavy hawser fitting the rims, and substituted these for the tires, bolting them with quarter-inch bolts through the rims and binding the ends together with wire. The return trip was some twenty miles, and the ropes, though worn quite flat, protected the rims successfully.

The Paris-Berlin Race.

The Paris-Berlin race, which is scheduled to finish June 29, will be run by the racing machines in the following laps: First day, from the Fort of Champigny to Aix-la-Chapelle, 284½ miles, via Rheims and Sedan; the second day, from Aix-la-Chapelle to Hanover, 276 miles, via Cologne and Düsseldorf; the third day, from Hanover to Berlin, 182 miles, via Magdebourg; total 743 miles.



THE DE LOURA BALANCED ENGINE.

The tourists will consume eight days on the trip, as follows, beginning June 22: Paris to Rheims, 99 miles; Rheims to Luxembourg, 130 miles; Luxembourg to Coblentz, 114 miles; Coblentz to Frankfurt, 80 miles; Frankfurt to Eisenbach, 114 miles; Eisenbach to Leipzig, 107 miles; Leipzig to Potsdam, 85 miles; Potsdam to Berlin, 19 miles.

Control Contests by the English Motor Club.

An interesting series of control races was carried out under the auspices of the English Motor Club on Saturday, April 27, at the Crystal Palace grounds. The course covered two miles of track of very varied character, in which were eight stations, at each of which the competing vehicle had to be stopped. There were eighty entries and ten classes, besides a 200-yard race with flying start.

The De Loura Balanced Engine.

The accompanying illustration shows a gasoline engine in which a novel arrangement is used to balance the moving parts. It has two pistons working in opposite directions in one cylinder, with combustion taking place between them. But instead of working on two crank shafts they work on one, with cranks 180° apart, and the center lines of the two ends of the cylinder are offset so that each piston is in line with its own crank pin. In place of connecting rods, Scotch yoke connections are used, each crank pin turning in a block which slides up and down in the yokes A A. The nearer piston has a straight piston-rod connection to its yoke, while the further piston carries top and bittom lugs, B, which work in slots in the mouth of the cylinder, and are connected to the yoke by the long bolts C. A cam shaft on top of the crank case works the exhaust valve and jump-spark trembler, while the inlet valve on the side of the engine draws liquid gasoline in with the air, no carbureter being used.

The Wagner Mfg. Co., 5 to 7 Prospect Street, Rochester, N. Y., are makers of this engine.

The Maltby Motor Bicycle.

The motor bicycle shown in the accompanying illustration is made by F. D. Maltby, 10 Clinton Street, Brooklyn, N. Y. The crank case is built into the lower frame, and the motor, which is rated at 1¼ HP., is attached by a system of clamps and locking sleeves. The crank case has lugs which support an eccentric sleeve carrying the pedal cranks. A half turn of the eccentric sleeve disconnects the pedals from the motor. The wheel base is long, being 54 inches. One and a quarter gallons of gasoline are carried.

THE MALTBY MOTOR BICYCLE.

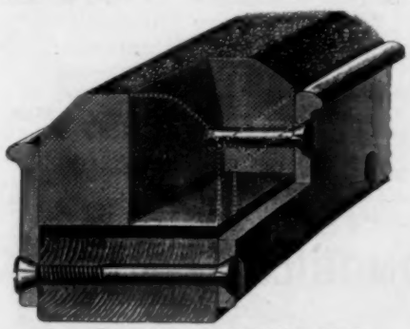
Wanamaker Opens an Auto School.

John Wanamaker has supplemented his automobile agency business by opening a building at 23d and Walnut Sts., Philadelphia, as a stable and driving school. A track surrounding the building will be used for instruction purposes, and will

contain dummies of various sorts for the aspiring chauffeur to dodge. The second and third floors will be used for storage, and the basement will contain all necessary facilities for changing and repairs. A staff of mechanics will be at hand for the purpose of instructing purchasers in all the details of their machines.

The Stevens Non-Slipping Tire.

The accompanying cut shows the construction of the new "indurated fabric" tire, made by the Auto-Dynamic Co., 140 W. 39th St., New York, and claimed by them to possess exceptional qualities of lightness, long life and resistance to slipping. In brief, the tire is built up of many plies of canvas, impregnated with rubber and vulcanized together under pressure. The fibres are disposed diagonally to the radius at any point, and only the edges of the canvas are presented to the road surface. The built-up plies are backed by a steel rim and bolted between the two side plates shown. Such a tire naturally has great strength, and will stay on the wheel till it



THE STEVENS NON-SLIPPING TIRE.

is worn out. The makers state that the non-slipping quality which distinguishes it from rubber is due to the picking up of sand and gritty particles, which constantly lie imbedded in its surface. Elasticity is not claimed for this tire, which is intended mainly for use on commercial wagons as a substitute for solid rubber or iron tires. In the vehicles built by the Auto-Dynamic Co. the whole machinery equipment is spring-supported, and the makers claim that that construction, relieving the tires of any shock-absorbing duty, is the only logical one.

Business News.

The Electric Vehicle Co. will shortly open a branch at 267 Wabash Ave., Chicago.

Gray & Davis, Amesbury, Mass., have issued a catalogue showing the various styles of carriage and automobile lamps manufactured by them. These include candle, oil, and acetylene lamps of all sizes.

The Brooklyn Automobile Co. has opened a storage and repair station at 1239-1243 Fulton St., and has the Long Island agencies for the Locomobile Co. of America and the Woods Motor Vehicle Co.

The Steam Carriage Boiler Co., Oswego, N. Y., reports a cable order from England for a number of boilers. The company is increasing its facilities and states that it is in a position to fill orders promptly.

The Autocar Co., Ardmore, Pa., reports that its factory is working double shifts now on the orders for its standard carriages. It is considering the advisability of manufacturing the 12-HP. touring car, illustrated on another page, for the trade after its spring orders are filled.

A 3½-HP. De Dion motor is used by the De Dion-Bouton Motorette Co., Brooklyn, N. Y., to drive an electric-plating dynamo. It runs at 1,600 r. p. m., and is belted to the dynamo. The muffler and carbureter are of the standard vehicle patterns, and the cylinder is cooled from the street mains. Gas engines supply all the power for the shops of this company.

The Century Motor Vehicle Co., Syracuse, N. Y., authorizes a denial of any reports that its factory has been damaged by fire or that it is unable to fill its orders promptly.

Under the title of "Three Men in a Vehicle," the St. Louis Motor Carriage Co. publishes an account of a trip from Boston to New York, written by R. B. Bramwell, who accompanied John L. French and a friend over the Springfield-New Haven route early last November. It is entertainingly written, and the route is fully described. We understand that the company will send a copy for the asking.

Under the guidance of W. S. Rogers, until recently general manager of the Ball Bearing Co., Boston, and of E. P. Wells, President of the Steamobile Company of America, Keene, N. H., a new company has been incorporated in Delaware for the manufacture of all kinds of ball bearings and small railroad equipment. The name of the concern is the Roller Bearing & Equipment Co., and its factory will be located at Keene, N. H.

The Olds Motor Works, Detroit, Mich., is issuing a second edition of their attractive little pamphlet describing the "Oldsmobile." This pamphlet is illustrated with numerous photographs showing the "Oldsmobile" under many conditions of service, including a number of snow pictures. The company writes that owing to the large demand for its gasoline vehicles it has discontinued the manufacture of electrical carriages.

The De Dion-Bouton Motorette Co., Brooklyn, N. Y., announces that it has considerably enlarged its accessory and supply department, and has put this under C. G. Wridgway's management. A large stock of accessories will be carried, and one or two additions will be made, in the shape of a special high-test mineral oil for engine cylinders. The company is just introducing a hydrometer especially graduated for users of gasoline vehicles.

The Banker Bros. Cycle Co., Highland and Centre Aves., Pittsburg, Pa., is just moving into its new quarters, where it has extensive accommodations for the storage, stabling and repair of automobiles. They have also a fine salesroom, in which to display the De Dion-Bouton Motorettes, for which this company has the Pittsburg agency. They report that they are already finding their new building too small, and are arranging to put up a larger place.

The Standard Roller Bearing Co., 2326 Market St., Philadelphia, has increased its capital to $1,000,000. Its former capital and plant were quite insufficient to handle its business in the proportions to which it has lately grown.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Co., Jersey City, N. J., the old board was re-elected by a large majority. It consists of the following members: Edward F. C. Young, John A. Walker Daniel T. Hoag, Richard Butler, William Murray, Edward L. Young, and Joseph T. Bedle. President, E. F. C. Young; Vice-President and Treasurer, John A. Walker; Secretary, George E. Long, were re-elected by the directors. Judge Joseph E. Bedle was also re-elected as counsel.

Patents.

672,941—Automobile. Issued to B. F. Jackson.
673,226—Automobile gearing. Issued to F. J. Stallings.
673,123—Carbureter. Issued to J. Henderson.
673,365—Carbureter. Issued to A. H. Hopkins.
673,336—Motor cycle. Issued to E. N. Dickerson.
673,055—Pneumatic tire. Issued to J. Hubbard.
673,110—Motor vehicle. Issued to G. A. Bronder.
673,071—Motor vehicle reversing gear. Issued to A. Adamson.
673,442—Vehicle alarm bell. Issued to F. Mossberg.
673,798—Carbureter. Issued to E. Kempshall.
673,799—Carbureter. Issued to G. L. Reenstierna.
673,739—Vehicle driving mechanism. Issued to F. B. Stearns.
673,619—Motor vehicle. Issued to Haynes & Apperson.
674,034—Speed governor for explosive engines. Issued to A. Krastin.
674,251—Automatic tire inflating apparatus. Issued to T. H. Anderson.
674,022—Vehicle tire. Issued to F. A. Seiberling.
674,256—Vehicle traction tire. Issued to H. M. Du Bois.
673,861—Mechanically propelled vehicle. Issued to J. B. Cummings.
674,372—Automobile vehicle. Issued to J. C. Anderson.
674,812—Carbureter. Issued to T. McCormick.
674,665—Power transmitting means for horseless carriages. Issued to J. C. Blevney.
674,436—Pneumatic tire. Issued to W. Covintree.
674,478—Solid rubber vehicle tire. Issued to F. A. Seiberling.
674,666—Motor-driven vehicle. Issued to J. C. Blevney.
674,400—Horseless-vehicle steering device. Issued to F. R. Hiester.
674,521—Clutch device for self-propelling vehicles. Issued to L. A. Schlebecker et al.

"What is so rare as a day in June"—with an

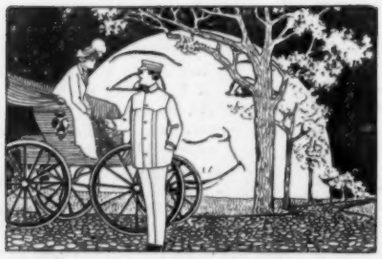
The perfect day and the perfect motor carriage "go hand-in-hand"

It has taken the highest order of French motor advancement and all the ingenuity of Orient construction to make this runabout a "distinctive automobile."

It is applicable to both business and pleasure—is supplied with enough reserve power to meet all emergencies—and is equipped with the famous 5-horse power Aster Motor to sell for $850. It is a duty the intending automobile purchaser owes to himself to get full details from the

ORIENT BICYCLES
ORIENT MOTOCYCLES
ORIENT AUTOMOBILES

WALTHAM MFG. CO.
Waltham, Mass.



The Automobile Suit !

Our newest production—made of Cravenette—light-weight, waterproof, stylish, durable, practical—ideal summer garments.

Everything else to wear with it.

Everything else good that man or boy wears !

Smith Gray & Co.

NEW YORK STORE, BROADWAY, COR. 31st ST. | BROOKLYN STORES, Broadway & Bedford Ave., Fulton St. & Flatbush Ave.

Automobile Bargains

We have a choice selection of steam, gasoline and electric automobiles in fine condition, at prices ranging from $400 up.

Send for our price list before purchasing elsewhere. **DuBois' Automobile Agency,** 220 Broadway, New York

FOR SALE.

WILL EXCHANGE LOCOMOBILE in good condition for De Dion-Bouton motorette or some other type of gasoline carriage. Address, Advertiser, care The Automobile, 150 Nassau St., N. Y.

THE GAS ENGINE HANDBOOK

By E. W. ROBERTS, M. E.

Pocket size, 3½ x 5¼ inches, bound in leather, 250 pages; 37 cuts. Price, $1.50.

A compact treatise on gas engine management and design, for the practical man. Contains numerous simple formulas for design and calculation of power.

Sent post paid on receipt of price by

THE AUTOMOBILE

150 Nassau Street New York

Books for Automobilists

Sent post-paid on receipt of price by THE AUTOMOBILE,

150 Nassau Street, New York.

Horseless Vehicles, Automobiles and Motor Cycles.

Steam, Hydro-Carbon, Electric and Pneumatic Motors.

By GARDNER D. HISCOX, M. E.

Large 8vo., 400 pages. Very fully illustrated. Price, $3.00.

Gas Engine Construction.

By HENRY V. A. PARSELL, JR., Mem. A. I. Elec. Eng., and ARTHUR J. WEED, M. E. Large 8vo., about 300 pages. Very fully illustrated. Price, $2.50.

Besides treating of American gas engines in general, there is given complete working drawings of a half horse-power gas engine. Rules are also given for working out the power and sizes of any engine.

The Electric Automobile:

Its construction, care and operation.

By C. E. WOODS, E. E., M. E.

12mo., 268 pages, illustrated. Price, $1.25.

Should be in the hands of every user or owner of an Electric Automobile.

Catalogue of electrical books for the asking.

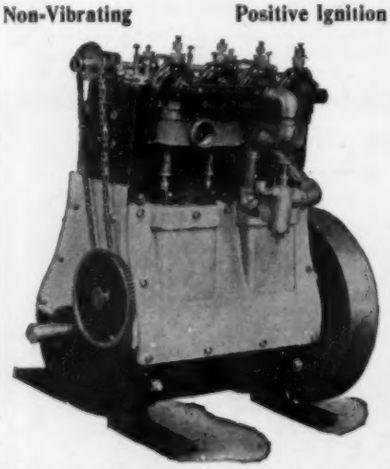
THE AUTOMOBILE, 150 Nassau St., New York.

6½ B. H. P.

Four-Cylinder Vehicle Engine

150 to 1500 Revolutions per Minute

Non-Vibrating Positive Ignition



Type A. Vertical Type B. Horizontal

Sold under a guarantee
Write for Prices and Description

Motor Vehicle Power Company

1227 Spring Garden St., Philadelphia, Pa.

New York Office, 62 Gold St.

THE LIFE OF AN AUTOMOBILE.

The easy working of the parts and the comfort of the driver

Largely Depends Upon Perfect Lubrication.

Dixon's Pure Flake Graphite Is the only lubricant that can withstand the heat in a gas-engine cylinder. Pure flake graphite perfectly lubricates motor cylinders and all working parts. We prepare Special Lubricants for Gears of Electric Motors and Special Lubricants for Chains of Motor Vehicles. *Correspondence solicited.* Samples free to responsible parties.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J.

THE AUTOMOBILE

reaches a larger number of persons directly interested in automobilism—especially users and prospective buyers—than any other publication.

It informs the novice ; it appeals to the enthusiast ; it keeps everyone posted.

It has no axe to grind. Its sole object is to further the cause.

Its reading pages are not for sale ;—that is why its advertising space is worth its price.

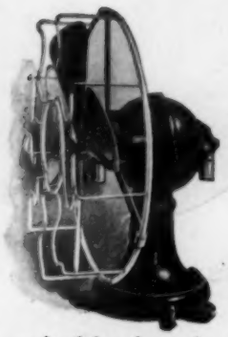
If you have a good thing to market, THE AUTOMOBILE will bring you results.

Shall we send you our Rate Card?

The E. L. Powers Company, Publishers

150 NASSAU STREET, NEW YORK

Real Comfort



at small expense and no trouble may be obtained by using Lundell Fans. Every purchaser of a Lundell Fan has the satisfaction of knowing that he has the best fan ever made. He will not have to pay frequent bills for repairs. It gives more breeze than any other, runs easily and noiselessly and requires the least attention. It is suitable for the house, office, public building, and, in fact, is adapted to meet all requirements. Better get one and be comfortable this summer. Be sure that the name **Lundell** is stamped on the base of the fan.

SPRAGUE ELECTRIC COMPANY

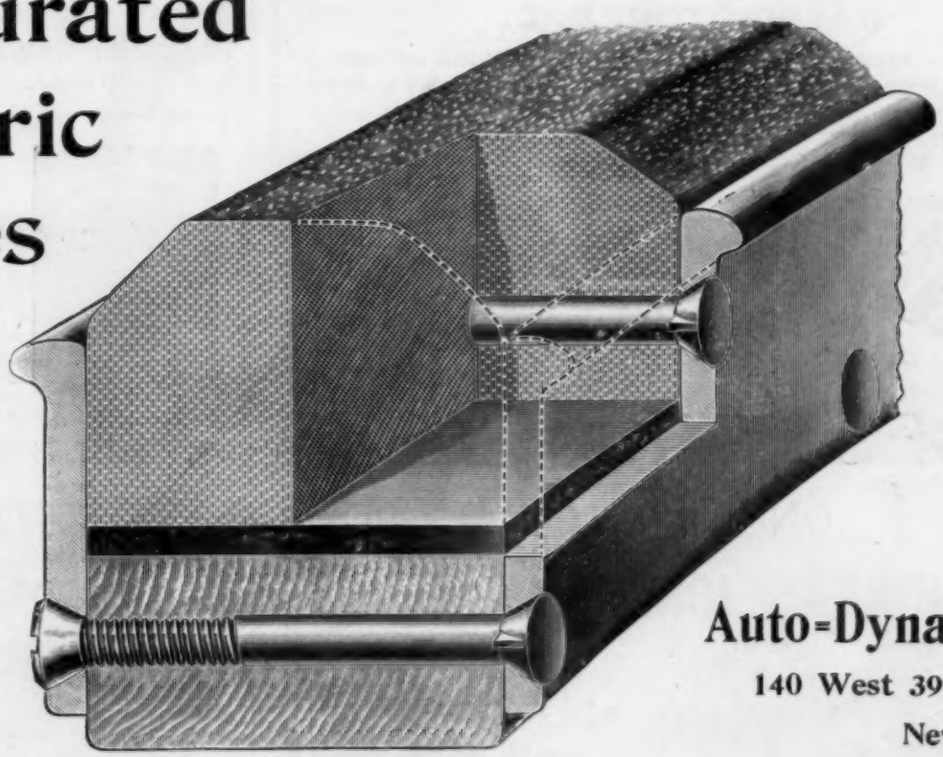
New York Chicago Boston St. Louis Baltimore

The Pan-American Number
OF
THE AUTOMOBILE

Has been postponed to July Issue. It will contain a complete résumé of the automobile features of the great exposition.

WATCH FOR IT

Indurated Fabric Tires



Safest
Cheapest
Strongest
Most
Durable

Send for Circular

Made under the Stevens Patents

Auto-Dynamic Co.

140 West 39th Street

New York City

The Oldsmobile

is a marvel to most people

It is only a simple fact however

Runs 40 miles on one gallon of gasoline

Starts at will from seat. Fully guaranteed

OLDS MOTOR WORKS 55 Concord Ave. Detroit, Mich.

---

7 and 18 H.P. Marine type compound engines, **$135.00** and **235.00**

Guaranteed water consumption per indicated H.P. per hour.

All-steel boilers from - - - **$75.00** up

Kerosene and gasoline burners supplied the trade, **$12.75**

Compensating gears, - - - **18.00**

Finished vehicles, Runabouts, Surries, Delivery Wagons, Omnibuses and Trucks, from **$400.00** up

Peerless Long Distance Steam Carriage COMPANY

Motor Vehicles and Supplies of all Kinds

WASHINGTON, D. C.

We Want Good Agents Everywhere
Our Line the Best

Our Prices are Right
Special Types to Order

Send for our Latest Catalogue of Automobile and Marine Goods

WE MAKE THE

BEST WHEELS

ON EARTH

PHINEAS JONES & CO.

NEWARK, N. J.

Revere Drop Forge Co.

Manufacturers ...of... **Drop Forgings**

of Every Description.

Send Models or Drawings.
Estimates will be cheerfully given.

BROADWAY, near Fenno's Corner

CHAS. ROBERTSON.
THOS. V. SARGENT.

Revere, Mass.

Ralph Clarendon Chadsey

Operate any Electrical Machine as driver, tourist or companion

Expert Electric Automobile Driver

Specialty: Racing and Exhibiting Engagement by appointment

Representative of NAT BUSHNELL CHADSEY

Stenographer, Typewriter, Notary Public. Legal Documents Drawn. Correspondence Composed. Plays, Manuscripts, Specifications Typewritten.

99 Nassau Street (Room 417)

Fulton and Nassau Sts. **New York City**

Portable Rheostats

which enable you to charge your storage batteries from any Edison station or trolley station, while touring.

Also equipments for private stables and for charging stables.

The Cutler-Hammer Mfg. Co.
Westfield, N. J.

Voltmeters

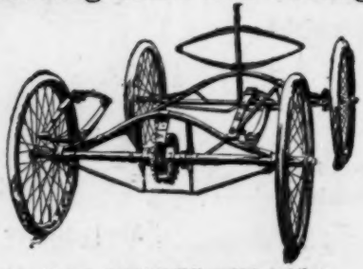
for testing storage batteries.

Volt-Ammeters

for testing primary batteries. Indispensible for ascertaining the condition of batteries.

L. M. PIGNOLET, 78 Cortlandt St., N. Y.

Running Gears and Fittings



If you intend building Automobiles Write for our descriptive circular....

A. W. Dolfini & Co., 322 Classon Av., Brooklyn, N.Y.

JUMP SPARK COIL

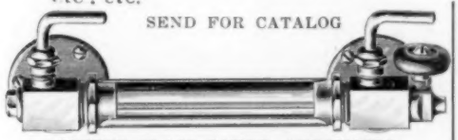
the BEST gas engine igniter. Acknowledged to be the most up-to-date method.

Electrical Specialties.

Engines, Boilers,

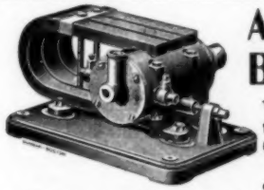
and Fittings. A complete line including Automatics, Gauges, Pin Valves, Safety Glass Gauges, etc., etc.

SEND FOR CATALOG



SAFETY GLASS GAUGE—AUTOMATIC.

Locke Regulator Co., Salem, Mass.



A FREE BOOKLET

Valuable to all interested in Gas or Gasoline Engines

Full descriptions of the best methods of ignition in this class of motors.

Describes apparatus best adapted for use in connection with automobiles.

Send for a copy. It may save you much annoyance and expense.

The Holtzer-Cabot Electric Co.
BOSTON (Brookline), Mass.

American Automobile Gauges and Pop Valves

Simple Accurate Durable

used by the leading manufacturers Specify the American and get the Best

Write for Prices.

SIDE OUTLET

Manufactured only by

American Steam Gauge & Valve Mfg. Co.

New York BOSTON Chicago

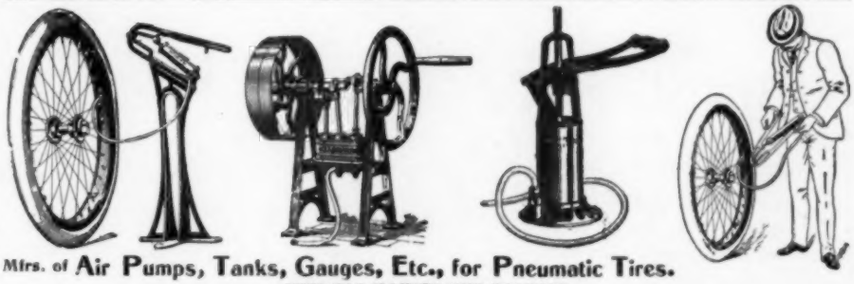
IT "GETS THERE" AND IT GETS BACK, TOO.

The "Hasbrouck" Gasoline Carriage

Will climb a 25 per cent. grade.

SILENT ODORLESS PERFECTLY BALANCED

The Hasbrouck Motor Co., Piermont, N. Y.



Mfrs. of **Air Pumps, Tanks, Gauges, Etc., for Pneumatic Tires.**

SEND FOR ILLUSTRATED BOOKLET.

Gleason-Peters Air Pump Co., 181-189 Mercer Street, New York, N. Y.

POINTER No. 3 from the Chicago Automobile Exhibit

What did your wife think of that ride in the Milwaukee Surrey? No noise, no fuss, no vibration, as easy as a baby carriage. That's the way they **all** work. And say Doctor, you noticed how the fire and steam is continued all day under that pilot light which was burning day and night.

No trouble about leaving your carriage to attend to your patients. Its always ready to go, whenever **you** are.

Even 15 below zero in Minneapolis this winter didn't phase it a bit.

Don't you want to own one of these superb carriages, made by the

MILWAUKEE AUTOMOBILE CO.

DE DION-BOUTON "Motorette" COMPANY.

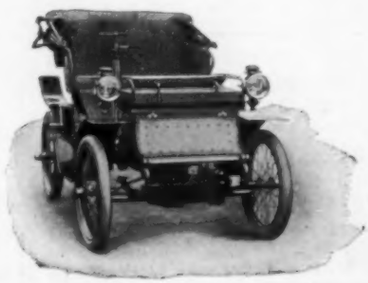
Sole American Agents and Licensed Manufacturers for De Dion-Bouton Co. France

A De Dion "Motorette" is the Standard Gasoline Automobile of two Continents

De Dion-Bouton "Motorette" Co.

Church Lane and 37th Street

Brooklyn, N. Y.



Automobile Exchange and Storage Co.

133, 135, 137 & 139 West 38th Street, New York.
Two Doors West of Broadway

Unsurpassed Storage for Automobiles

Repairs promptly executed by our skilled staff of mechanics.
Expert advice given to intending purchasers of Gasoline, Steam or Electric Carriages.

SOLE AGENTS FOR THE SALE OF

F. B. Stearns & Co.'s Gasoline Carriages and Century Motor Vehicle Co.'s Chainless Steam Carriages.

SOMETHING NEW

The Columbia Lubricants Co. are offering the only complete line of

Automobile Lubricants

that has ever been put on the market. Nothing gives automobile users more trouble than lubrication.

The oils and greases which we offer for Electric Gasolene and Steam Automobiles are all specially adapted and their use will obviate all trouble in the matter of lubrication.

Write us for more information if you are interested in getting the best results from your carriage.

Columbia Lubricants Co.
22 Burling Slip, New York City

Dietz Automobile Lamp

No wind affects its burning.
No jarring will extinguish it.
Its flame is clear white, and devoid of smoke or odor.
It burns ordinary kerosene (coal oil).
It holds sufficient oil to burn twenty-four hours.
It represents the experience gained in 60 years of Lamp Building.

Read the letter which a practical test of the **Dietz Automobile Lamp** brought forth:

Cleveland, Ohio, U.S.A., Dec. 12, 1900.

R. E. DIETZ CO., 60 Laight St., New York City.

Gentlemen: I am in receipt of your favor of the 8th, and being exceedingly busy I trust you will pardon me for not writing before.

I desire to say that I have used your lamps for a number of months on my carriage, and have found nothing that equals them. On my recent trip to New York I was obliged to drive in the evening, and I can say that your lamps, notwithstanding the extremely rough roads, never failed me, whereas an acetylene gas lamp I had on my carriage proved to be utterly useless for hard driving. I can cheerfully recommend your lamp for all automobile purposes.

Yours very truly,
ALEXANDER WINTON,
President The Winton Motor Carriage Co.

The trip Mr. Winton refers to is his great record-breaking one from Cleveland, O., to the Automobile Exhibition in New York City in November, 1900. 838 miles in 21½ hours.

R. E. DIETZ COMPANY, 60 Laight Street, NEW YORK CITY
Established 1840

DIAMOND TIRES

You can't point out better ones for
AUTOMOBILES
BIKE WAGONS
OR BICYCLES

The Diamond Rubber Co., Akron, O.

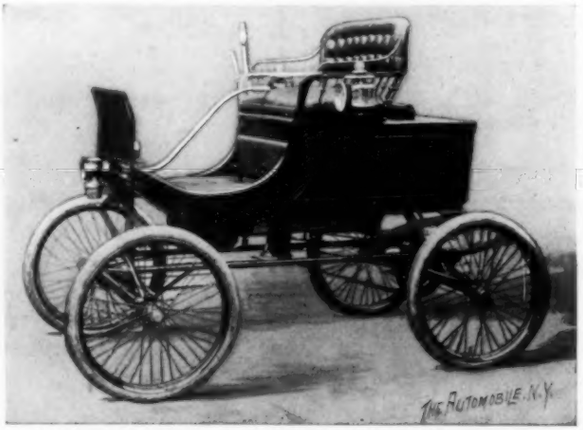
BRANCHES

1717 Broadway,	New York
234 Congress Street,	Boston
9 West Seneca,	Buffalo
435 North Broad,	Philadelphia
420-431 Wabash Avenue,	Chicago
310 Woodward Avenue,	Detroit

The Conrad Motor Carriage Co.

BUFFALO, N. Y.

Machinery Hung on Angle Iron Frame, Auxiliary Throttle, Patent Pilot Light



Runabouts
Stanhopes
Surreys
Delivery Wagons

OWING to the large increase in our business we are building a large factory at 1417 Niagara Street, which we will occupy after May 20th, 1901. This factory is especially adapted for the manufacture of automobiles. The change of location will not delay us in filling orders promptly.

This is the Wagon that ran 100 Miles at an average speed of 9.4 miles an hour

Not on Paper but in the 100 mile endurance test of the Long Island Automobile Club. The Daimler was the only delivery wagon entered in the contest, perhaps because it is the only one built that could finish.

YOU NEED THIS KIND IN YOUR BUSINESS

Highest Award Automobile Bearings Paris, 1900

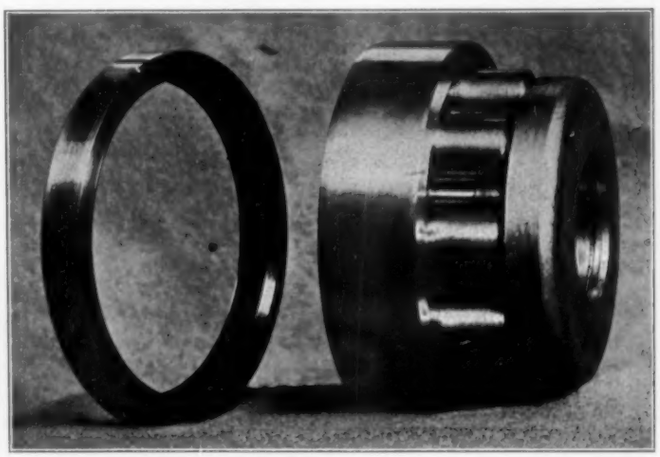
A R B

Highest Award Nat'l Export Exposition Philadelphia, 1899

ROLLER BEARING AXLE

COMBINED JOURNAL AND THRUST BEARING,

Single Bearings for Automobile Driving Axles, Motor Bearings Etc.



SINGLE BEARING,
showing outer race partially withdrawn, and bevel thrust ring.

Wheels Complete with Roller Bearing Hubs

Ca ried in stock for the ordinary Automobile sizes

Send for Circular

We give a Year's Guarantee on Every Bearing, Covering Defects of Breakage or Wear

European Branch
17 Soho Square
London, England

AMERICAN ROLLER BEARING COMPANY
Offices and Factory, 32-40 Binford St., - Boston, Mass.

Visit us at
Pan-American Exp'n
Buffalo, 1901

JUN 12 1901

ONE COPY RECEIVED

For Business **"Riker" Automobiles** For Pleasure

Branches

H. M. LIPPINCOTT
Stephen Girard Bldg.
Philadelphia, Pa.

DETROIT RIKER AUTOMOBILE CO.
253 Woodward Ave.
Detroit, Mich.

MOTOR CYCLE AND VEHICLE CO.
Washington, D. C.

RIKER STRAIGHT-FRONT BROUGHAM.

Branches

FRED. WARD & SON
48 Fremont St.
San Francisco, Cal.

APGAR & DICKINSON
135 East State St.
Trenton, N. J.

EDWARD GUNSTER
Wilkesbarre, Pa.

AUTOMOBILE CO. OF NEW ORLEANS
143 Baronne St.
New Orleans, La.

Main Office and Works
Elizabethport, N. J.
U. S. A.

Riker Motor Vehicle Co.

New York Office,
Salesroom, Storage and
Repair Station
104-106 W. 39th St.

Columbia **AUTOMOBILES**

ELECTRIC GASOLENE

In the Sixth Year of Successful Service

Forty Standard Types of
Pleasure and Touring Carriages,
Transportation Conveyances
and Delivery Wagons.

New Long Distance Batteries
Giving
Forty Miles on One Charge

MARK XIX COLUMBIA SURREY.

Write for 1901 Illustrated Catalog
and Revised Price List.

Reliability Durability
Simplicity Cleanliness

Electric Vehicle Company, 100 Broadway, New York

Please mention THE AUTOMOBILE when writing to Advertisers.